The RUBBER AGE

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LIBERIAN CONGRESS TO LIFT EXPORT TAX OF 12 CENTS A POUND ON RUBBER

Will Act on Measure at Meeting December 7 by Agreement with Firestone Interests—Expedition to Leave for Liberia this Month—British Take Plan Calmly

According to Dr. Joseph L. Johnson of Columbus, who was United States Minister to Liberia from 1918 to 1922, the Liberian Congress when it meets Dec. 7, will take immediate action to lift the tax of 12 cents a pound on rubber exports, by agreement with the Firestone Tire & Rubber Co., Akron. Dr. Johnson declared that this action will remove the bar to success which made it necessary to abandon British plantations there.

Dr. Johnson said that an American naval base and coaling station should be established on the Liberian coast. A steamship line between Monrovia and New York, connecting with an inland railroad system, is essential to the success of the Firestone concession in Liberia, he thinks. He declared that transportation facilities in Liberia are handicapping the development of the country. Roads and rail facilities would open up a vast store of wealth in addition to the potential rubber supply.

Many to Leave for Liberia

Reports from Akron indicate that several hundred men will be sent to Liberia to work on the Firestone plantations. It is expected that a great many will leave Akron this month as some persons have already completed arrangements. They are leasing or renting their homes and putting their affairs in order. Where possible Mr. Firestone is giving unmarried men preference for the African work. The entire city of Akron has taken an avid interest in Liberia; books on the country at the libraries are at a premium; and everyone seems to be talking about Liberia.

Donald A. Ross, manager of the plantation has already sailed for Liberia with W. H. Johnson, planting assistant, P. P. Taylor, assistant plantation manager, E. H. Farquharson, senior planter, C. B. Mansfield, soil expert who was in the recent Amazon research party and W. F. Peel, botanist. The two latter members were "borrowed" from the government.

Other men leaving this month include 16 Americans and four British engineers, picked from a list of over 1,000 applicants.

Among the Akron personnel will be: Ross Wilson, graduate of the engineering department of Akron University, formerly employed as assistant engineer at the Akron office of the B. & O. Railway, Warren Brocket, formerly employed in the cost department of the B. F. Goodrich Company, A. W. Holcomb, Electrical Engineer, and L. L. Putnam, planting assistant.

According to reports, members of the first expedition will be required to stay in Liberia for eighteen months. They will receive salaries ranging from $350 to $500 a month, one-half of which will be deposited to their credit in local banks and the other half to be paid them in Liberia.

To Found Twenty Settlements

Upon returning to America, after staying the required amount of time, they will get a three months' vacation with pay, according to present reports. If they return before their time is up they will have to pay their own transportation, which will amount to about $400.

It is the Firestone plan to divide the Liberian colony up into twenty settlements, each of which will have its own hospital, stores, engineers, builders, architects, soil experts and doctors.

Each of the engineers will probably be put in charge of a gang of natives and their work and discipline will be closely watched and checked up.

The first group of engineers will probably not arrive in Liberia until Christmas, as they will make stops along the way.

British Government officials and officials of the British rubber industry when informed of the plans of Harvey Firestone for a veritable rubber kingdom in Liberia expressed little concern. The general sentiment was, the new project would provide fair competition for British producers which might redound to the benefit of the industry as a whole.

Rubber men in England pointed out that it will be about five years before the Firestone plantations can produce rubber. During that time, it was claimed,

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LIBERIAN CONGRESS WILL LIFT RUBBER EXPORT TAX

(Continued from Page 71)

British producers hope to advance their output to a point where they will be able to compete successfully with the American company from a standpoint of prices.

The Stevenson act, under which British production is now limited, automatically will permit by the spring of 1926, the export of as much raw rubber as in the standard year of 1919, on which the restrictions are based. The act will not lapse, however, when the permitted export percentage passes 100 per cent of the standard, but will remain in force, and should the price of rubber again slump the Stevenson Act would again become operative.

One Company Derides Plan

Mr. Firestone has found an important commentor in the African International Corporation, Ltd., of London. A. E. W. Cripps, secretary of the corporation, in the following letter to the London "Daily Telegraph," gives the opinions of himself and his company on the enterprise and what it would mean to Liberia:—

"Those who have at heart the interests of the Republic of Liberia and most desire to see her aspirations realized cannot fail to be gratified by the announcements which have been made by Harvey Firestone as to his intentions toward that undeveloped but potentially wealthy country. Moreover, those who, like ourselves, have large interests in the republic and cannot fail to benefit materially by any scheme which leads to her development, must welcome any realizable proposition which tends in that direction. Unfortunately, the relization of Mr. Firestone's "dream" seems too far distant to afford much satisfaction to those who are more intimate than he with the difficulties with which he will have to contend in the future.

"We read with interest and no little amazement that it is intended to employ no fewer than 300,000 native Liberians upon the plantations, and that these are to be paid upon the basis of 1s. (24c) per diem. From this we deduce that the whole, and perhaps rather more than the whole, available working population of Liberia is about to enter Mr. Firestone's employ, and that to this end it is prepared to sacrifice the considerably higher wages already paid by the British, French, German, and Dutch companies, who, together with ourselves, have evidently been in the past quite unnecessarily generous toward our employees, since we have been accustomed to pay to our carriers even not less than 2s (48c) a day for their services. Further—and this would seem to be of some consequence—if all available labor is to be engaged upon rubber plantation, who in future is to collect the palm-kernals and coffee, upon the export of which the principal revenue of Liberia at the present day depends, and largely out of which the Government has, during recent years, made such manful efforts to cover its old indebtedness. Perhaps, however, Mr. Firestone is proposing to devote a portion of the £20,000,000 ($100,000,000) which he is providing for rubber plantation toward the cancellation of the debt due to the foreign bondholders. To do so, however, would seem to reduce the sum of £20 ($100) per acre at present allocated for bringing the plantations into bearing down to a somewhat dangerous margin.

"That a harbor and a breakwater should be constructed at Monrovia is undoubtedly a matter of the first importance, and is fraught with incalculable advantages to the country. To accomplish so great an engineering feat would, indeed, entitle Mr. Firestone—even if, as we understand, it is not to be completed under his own direct auspices—to the lasting gratitude of all Liberians and of all foreign interests in the Republic. It is difficult to understand, however, how so great a scheme is to be brought to fruition. The conditions at Monrovia are similar to those which exist at nearly every West African port situated at the mouth of a river. The accumulation of sand known as the "bar" is continually shifting, and it is by no means unknown that the whole position of the "bar" should be altered in the course of a single night, so that at present, as our experience proves to us, the position of the channel is continually changed, and hundreds of tons of sand are found to be accumulated where previously deep water ran. It is to be hoped tht Mr. Firestone's experience may not be similar to that undergone by a company who completed a breakwater and pier rather further down the coast, only to discover when a party of officials went to inspect them the following morning that they had been buried as effectively as Atlantis.

Good Roads Important

"One feature of the scheme, however, strikes us as not only very practicable, but exceedingly important, and that is the building of roads, towns, hospitals, and other public works, but more especially of the first named. Unfortunately, the country is honeycombed with swamps and rivers, large and small, which will require bridging.

Yours, &c.,

"For and on behalf of African International Corporation (1924) Ltd.,

"A. E. W. CRIPPS, Secretary.

34, Nicholas-lane, Lombard-street, E.C. 4, Oct. 19."

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(Special to THE RUBBER AGE*)*

It would surprise most people to know that only one out of every 400 people in the British Isles has a rubber hot-water bottle, said Sir Charles Higham, the most eminent British advertising expert and publicity director of the Dunlop Rubber Co., in an address on "Collective Advertising" at a recent meeting of the Institution of the Rubber Industry in London. Why, he asked, did not the rubber industry as a whole advertise the fact that every home should have a rubber hot-water bottle, from the viewpoint of airing the bed and keeping one warm, and thus improving health?

"Collective advertising," continued Sir Charles, "is that method of publicity by which a trade collectively endeavors to induce the public to buy more goods or to use more of the services it has for sale.

"People should be asked to use rubber as covers for shelves, tables, washstands, or for lining sinks. How many dishes would be saved if they were dropped into a rubber lined sink instead of one made of iron or porcelain The India tea growers are making the United States drink more tea—not necessarily India tea—and as a result the people are drinking more India tea. Thus the growers are helping the whole tea trade, as well as helping themselves. If there were a small advertisement in all the daily and evening papers suggesting that people should 'go to the theater,' thousands who did not go now would go.

"Not only can a trade or industry create a larger market for its products by all the concerns composing it combining together to stimulate interest in its productions; by the same method it can also keep a market stable or maintain the demand. This is the advertising of the future. It must supplement competitive claims, and will resuscitate those so-called 'dying industries,' which are really only suffering, because their markets are too local. We have failed, as industries, to use the force which individual concerns have found so vital to their development. When trade federations take advertising seriously they will learn that they could both create and stabilize their markets, to the lasting good of all concerned."

Goodyear Executives Meet

Factory executives of the Goodyear Tire & Rubber Co. and its subsidiaries recently conferred with executives of the Akron plant in the Fifth Annual Interplant Conference at the Goodyear offices. The executives from California included: Harry Blythe, general superintendent; R. J. Brady, purchasing agent; J. P. Heany, cotton mill superintendent; W. R. Urquhart, mechanical engineer; and H. E. Barron, division superintendent. The Canadian factories were represented by E. H. Koken, superintendent of the Toronto plant; R. T. Brown, experimental engineer; H. A. Allman, division superintendent; and A. M. Hardy, Superintendent of the Bowmansville plant. Those from Connecticut were C. W. Young, superintendent of the Goodyear Cotton Mills; and L. S. Hall, superintendent of the Devon Mills.

Cupples With Philadelphia

H. L. Cupples was recently appointed chief chemist of the Philadelphia Rubber Works, Akron, reclaimers.

VULCAN STILL OPERATING DESPITE PLEA FOR SALE

According to George B. Weingerter, receiver, the factory of the Vulcan Rubber Co. on West Lake Road, Erie, Pa., is operating on a three-shift basis, 24 hr. a day, despite the fact that attorneys representing H. Muehlstein & Co., Inc., a creditor recently filed an intervening petition asking for the discontinuance of operations and the sale of the factory. "We have more orders on our books than we can possibly take care of," said Mr. Weingerter. "We are turning out nothing but hard rubber products.

"I have every reason to believe that the affairs of the company can be satisfactorily straightened out in the end."

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August	17th	- - 75 cents
October	31st	- - $1.00

LOOKING AHEAD - -

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LARGER MALAYAN EXPORTS DO NOT INCREASE STOCKS

(Special to THE RUBBER AGE*)*

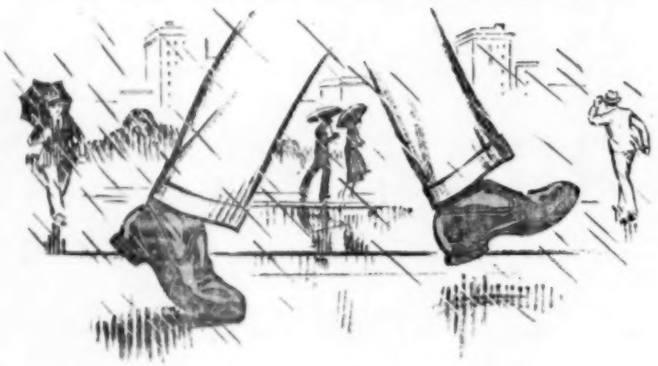
The latest rubber statistics from British Malaya indicate little prospect of any appreciable addition during the next few weeks to the stock in London. Exports in September amounting to 29,425 tons were the highest recorded so far this year; but although shipments proved to be 1,700 tons in excess of those for the previous month, the balance left over for dispatch to Britain was smaller than in August, owing to increased quantities taken by the United States, Continental Europe, and Japan.

Over a year ago, when less profitable prices were being obtained, fears of a greatly increased production of Dutch native rubber were entertained. It is interesting to note, therefore, that despite the attractive range of values, Malayan re-exports—chiefly wet native rubber—in September were less than 13,000 tons, a total which was lower than those for June and July

India Promotes Wright

The India Tire & Rubber Co., Akron, Ohio, announces the appointment of B. B. Wright as manager of their Jacksonville, Fla., branch, which has just been established. Mr. Wright was formerly assistant manager of the Dallas branch of India Tire & Rubber Co. Previous to that he held various executive positions with the Gates Rubber Co.

IT PAYS TO MICRONIZE



Under the Varnish

IN the rush and scuffle of hurrying feet the tender film of varnish is soon destroyed—often exposing the greyish hue of the underlying vamp.

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FORM PIVOT MEN'S CLUB AT MASON TIRE & RUBBER

Inspired by the desire to better serve themselves and their company, the Factory Executive Organization of the Mason Tire & Rubber Co. has organized a body known as The Pivot Men's Club. The purpose of this body is to further their knowledge of how best to solve the many problems arising daily in the modern business world by the adoption of an educational program. The accomplishment of this program will be made through discussion of some phase or phases of business at each regular meeting and through lectures by men prominent in the line of business in which they are engaged.

The Mason men feel that greater efficiency arises only through a knowledge of Industrial operations as a whole rather than confining their sphere to departments or sections of departments alone. The recreative or social phase of the club was not overlooked, and the officers and members of the club expect to have several social events of interest for the coming season. The annual sales conference, held at Kent Oct. 21-24, was entertained by the club at a smoker Wednesday evening, Oct. 21. A feature of the evening was several boxing bouts. Music was furnished by Nobel's Entertainers of Cleveland; and a lunch was served after the entertainment.

Sound in Receivership

Harry R. Greenlee was reently appointed receiver of the Sound Rubber Co., Tacoma, Wash., and John D. Fletcher was appointed attorney for the receiver by Judge M. L. Clifford in Superior Court. The petition was filed by the Tacoma Savings Bank & Trust Co. and set forth that the Sound company, formerly the Western Rubber Co., failed to meet an interest payment of $7,000 on Sept. 1, has failed to pay dividends of $10,000 on preferred stock and 1923-4 tax on real estate and 1924 personal tax totaling $150,000. Mr. Greenlee, whom the court appointed receiver, was for a number of years with the Republic Rubber Corp., Youngstown, Ohio. He became receiver for the Erie Tire & Rubber Co., Sandusky, Ohio, and operated the plant so successfully that upon the reorganization of the company under the name of the Erie Rubber Corp. he was appointed general manager, which position he held until recently.

Canadian Branch Reorganized

The American Engineering Co., of Philadelphia, manufacturer of Taylor Stokers, Lo-Hed electric hoists and other machinery, announces that its interests in Canada have been taken over by The Affiliated Engineering Companies, Ltd., with headquarters in the Southam Building, Montreal. This company has been formed by the merger of the Taylor Stoker Co., Ltd., of Montreal, and the Cleaton Company (Canada), Ltd. Mr. M. Alpern, President of the American Engineering Co., is chairman of the board of the new company and Mr. F. S. B. Heward is president.

AUGUST INVENTORIES OF TIRES SHOW INCREASES

According to a statistical bulletin issued recently by the Rubber Association of America covering the reports of its members which represent 75 per cent of the industry, an increase in the production of tires and a falling off in shipments caused a subsequent increase in inventories for August. The production of casings during the month totaled 4,205,230, as compared with 4,190,686 in July and 3,234,741 in August, 1924. Production of balloon tires showed a decline, reaching 1,418,347 in August, compared with 1,516,896 in the previous month.

Inventories of all tires at the end of August amounted to 5,445,942, an increase over the July figure of 4,815,498 and above the August, 1924, total of 4,447,016. Shipments last August were 3,570,158, against 4,723,431 in the previous month. Shipments during August were also below the August, 1924, total of 4,193,114. Inventories of all tubes, high pressure cords, balloons, fabrics, high pressure inner tubes and balloon inner tubes all showed a substantial increase.

The inventories of solid and cushion tires totaled 170,419 in August, showing a considerable increase for the month but well below the figure for the corresponding month last year. Production of these tires, which totaled 75,166, showed only a slight decline from the July total of 75,228, but shipments fell from 74,715 in July to 57,117 in August. This total was also lower than the August, 1924, figure of 60,684.

The consumption of crude rubber, in the manufacture of tires, totaling 52,170,657 lb. in August, showed a slight decline from the July figure of 53,197,164. Consumption of cotton in tires showed a decline from 16,013,761 lb. in July to 15,758,123 in August.

Factory Figures for August

	August	July	August, 1924
ALL CASINGS			
Inventory	5,445,942	4,815,498	4,477,016
Production	4,205,230	4,190,686	3,234,741
Shipments	3,570,158	4,723,431	4,193,114
ALL TUBES			
Inventory	6,953,331	6,476,566	5,758,310
Production	5,713,295	5,658,214	5,015,687
Shipments	5,191,912	6,855,042	5,626,844
HIGH PRESSURE CORDS			
Inventory	2,895,254	2,502,055	2,679,205
Production	2,409,070	2,181,645	1,983,530
Shipments	1,999,548	2,479,160	2,663,087
BALLOON CASINGS			
Inventory	2,023,580	1,654,629	765,002
Production	1,418,347	1,561,896	501,166
Shipments	1,053,625	1,434,981	435,572
FABRICS			
Inventory	527,108	658,814	1,032,809
Production	377,813	447,145	750,045
Shipments	516,985	809,290	1,094,455
HIGH PRESSURE INNER TUBES			
Inventory	4,970,360	4,677,647	5,006,578
Production	4,436,578	4,297,495	4,588,385
Shipments	4,102,160	5,357,295	5,257,509
BALLOON INNER TUBES			
Inventory	1,982,971	1,798,919	751,732
Production	1,276,717	1,360,719	427,302
Shipments	1,039,752	1,497,747	369,335
SOLID AND CUSHION			
Inventory	170,419	152,587	183,159
Production	75,166	75,228	52,516
Shipments	57,117	74,175	60,684

Federal Plans Addition

The Federal Rubber Co., Cudahy, Wis., a subsidiary of the Fisk Rubber Co., Chicopee Falls, Mass., plans the addition of three stories to its factory building No. 28. The addition, which has been estimated to cost $165,000, will be of brick, 141 by 210 feet, of steel skeleton construction, with wooden floors and roof. Plans for the improvement were drawn by G. B. Allen of the Fisk company and the project will be supervised by F. W. Andree.

Start Work on Servus Plans

Architects recently commenced work on the plans and specifications for the new addition to be erected to the factory of the Servus Rubber Co., Rock Island, Ill. The architects were instructed to provide additional space for vulcanizing over the boiler room of the original building. A space of 25 by 40 feet will be provided. The new addition will be 132 by 84 feet, of brick, and three stories in height.

MICHELIN WILL BUILD HOUSES FOR EMPLOYEES

A new type of English house is to be built in France by the Michelin Tire Co. This concern has decided to build Peter Nissen houses for the accommodation of its work people at Clermont Ferrand. These houses are on the system devised by Colonel Peter Nissen, D.S.O.

Since the war Colonel Nissen has adapted the roof so as to meet the present housing need. The Ministry of Health has sanctioned it for a 40-year loan. Houses on this system are being constructed in several parts of England and in Edinburgh. The Michelin company has for some time past been searching for an economical mode of construction for its industrial housing scheme.

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GOODRICH RELEASES 300 BALLOONS IN NEW TEST

Three hundred sounding balloons ranging in sizes from two to three feet in diameter and inflated with hydrogen gas were liberated from Shenandoah, Iowa, on Nov. 3. This was the beginning of an experiment arranged by The B. F. Goodrich Rubber Co., Akron, in cooperation with the Henry Field Seed Company's radio station KFNF.

The purpose of the experiment was twofold: First to study the directional features of different atmospheric levels for aeronautical information and second to study those currents with respect to their possible influence upon radio broadcast reception.

The Goodrich company's interest applies to both fields. They were the first rubber company to accept radio as a medium for presenting good-will entertainment to millions of radio listeners and they manufacture many hard rubber radio accessories. On the other hand they are extensively interested in aeronautics, being manufacturers of many accessories for both lighter and heavier-than-air craft.

The balloons used in this experiment were of the type government meteorological experts use in taking altitude tests of atmospheric conditions. They were inflated at varying pressures pre-determined to gauge the altitude at which the balloon would travel.

Tags attached to the balloons carried specific instructions. These instructions together with the announcements that were broadcasted daily from KFNF helped to get full cooperation of those who found the balloons in reporting location and time.

The return of these tags enables the completion of records which can be studied by both radio and aeronautical engineers.

Converse Expects Good Year

From present indications, it is confidently expected that this fiscal year will be the best in the history of the Converse Rubber Shoe Co., Malden, Mass. For the four months ended July 31, the company showed net profits after taxes and dividends were deducted, of $178,795, which is equivalent to $52.28 per share on the $335,500 common stock. This issue is owned by President Converse and his associates. The company had current assets of $3,595,853 against current liabilities of $1,474,251, as of July 31.

Trump Starts Additions

Construction was recently started on a new three-story brick factory building for the Trump Rubber Co., Akron. An additional story will also be built on the present Trump office building for a laboratory. According to R. M. Trump, president, the total cost of the improvements will be $35,000. The new building, which will have a total area of 18,000 square feet, will increase the capacity of the factory 50 per cent.

RADIO BOOKLET ISSUED BY RUBBER ASSOCIATION

"Radio Sets that Jack and Dad Built—and How They Built Them" is the title of a 48 page booklet published by the Hard Rubber Manufacturers Division of The Rubber Association of America, Inc.

Written by M. B. Sleeper, Editor of *Radio Engineering* and a recognized set-building expert, the booklet describes and illustrates five standard "hook-ups." It tells how Jack inoculates his skeptical Dad with the "radio bug" by making a crystal set. Dad's interest aroused, he and Jack build first an Ambassador set, next an RX-1, then a Browning-Drake "Five" with a three-step resistance amplifier, and with their final 8-tube "Cotton" Superheterodyne win the prize in a radio set building contest.

Besides the wiring and schematic diagrams and step-by-step assembly instructions for each set, the booklet is profusely illustrated with photographs of the different sets and contains many helpful suggestions regarding antennas and grounds, installations, maintenance, and the care and use of dry cell and storage batteries and current tap devices. A section is devoted to the advantages of hard rubber insulation in radio sets. The Booklet is excellent propaganda for the Hard Rubber Manufacturers Division.

The booklet can be purchased from local radio dealers for 25 cents a copy or direct from The Rubber Association of America, Inc., 250 West 57th Street, New York City.

Announcing

GRASSELERATOR 808

THE SUPER ACCELERATOR FOR GENERAL USE

"Faster than the common accelerators—
Safer than the ultra accelerators"

—Shorter cures and lower temperature
—No scorching—inactive under 110° C (230° F)
—Extremely high tensiles and relatively heavy loads at low elongation
—Reduction of sulfur and production of non-blooming stocks made possible without sacrificing quality
—Miscible with all the common rubber solvents
—Can be incorporated in the batch at any period of mixing
—Master batches, compounds and cements safely stored
—Relatively small amounts of 808 give best results with lowest accelerator cost

We will gladly submit sample, information and technical assistance in using.

THE GRASSELLI CHEMICAL COMPANY
RUBBER SERVICE DEPT., 347 MADISON AVE., NEW YORK

HODGMAN ASSETS SOLD IN COURT FOR $625,500

After nearly an hour of spirited bidding, the assets of the Hodgman Rubber Co., Tuckahoe, N. Y., were recently sold to Max Marx, real estate operator, for $625,500, all cash. Mr. Marx's first bid was $540,000 but was gradually increased under competition.

Judge A. N. Hand, sitting in the U. S. District Court, acted as auctioneer at the hearing which was attended by representatives of the debtors, all of whom approved the final bid. The hearing was held on the order of Judge Winslow, who directed on October 1 that sealed bids be made to the receivers on or before October 14 and that these bids be opened in court. Counsel for the receivers announced that five bids had been received. The two highest bidders were Mr. Marx, who first bid $540,000 in cash and M. B. Kaufman, who bid $625,000, but not all cash. Spirited bidding then took place between these parties.

The bidding was made on the basis of a statement of the business of Oct. 14, 1925, submitted at the meeting by James Newton Gunn, who with Gordon Auchincloss, are the equity receivers conducting the business since the proceedings were instituted.

A difference in condition of about $6,000 between Sept. 25, when the original bids were made, and Oct. 14 on the basis of which the successful bid was made, was reported by Receiver Gunn.

Hewitt Broadcasting

Through an arrangement with WGR, the Federal Radio Station in the Statler Hotel, the Hewitt Rubber Co., Buffalo, N. Y., is broadcasting a half-hour program each Friday evening from 10:30 to 11. As it is purely an entertainment program and has met with much appreciation, the Hewitt company has received many complimentary letters. The program is in charge of Ernest J. Clare, advertising manager of the Hewitt Rubber Co., who is well known to radio fans for his parodies and character sketches.

Sees Good Prospects

According to officials of the Seamless Rubber Co., New Haven, Conn., prospects for business in the rubber industry for the next six months are very good. It is believed that these months will show a fair increase over any similar period for the last three or four years. As prices of rubber sundries have not kept pace with the crude rubber market, further advances are inevitable. The plant is being operated at the highest ratio in five years.

Elmer S. Firestone

Elmer S. Firestone, aged 61, brother of Harvey S. Firestone, president of the Firestone Tire & Rubber Co., Akron, died recently in his home at Los Angeles, Calif. Mr. Firestone was born in Columbiana, Ohio, and has been associated with the Firestone company since its inception. He served as branch manager in Cleveland, Cincinnati, Buffalo, San Francisco and Los Angeles.

Mr. Firestone is survived by his widow, Mrs. Lydia Firestone, three daughters, Emelda, Mrs. Theodore Barrs and Mrs. Merle Ake; he also leaves two sons, Nicholas and Clinton, and two brothers, Harvey S. of Akron and Robert J. of Cleveland. The body was taken to Columbiana where funeral services were held. Burial was in the family plot.

L. E. Sisler

Dr. L. E. Sisler, aged 65, director of the Firestone Tire & Rubber Co., Akron, died recently at his home in Akron of heart failure. He was one of the pioneer rubber men of Akron.

SAMSON SALES OFFICES MOVED TO NEW BUILDING

The executive and sales offices of the Samson Tire & Rubber Co., which had been located at 410 West Pico St., Los Angeles, Cal., were recently removed to a new building at 713 East Eighth St. The new building occupies an area of 12,500 sq. ft. at the corner of East Eighth and Croker Sts. It is constructed in the Spanish Renaissance style with walls of polychrone stucco embellished by a frieze in tile. The interior is finished in textured plaster in gold and brown, after the Spanish fashion. The company's factory at Compton, which has been doubled four times in the past seven years, is running at full capacity with three shifts.

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TUCKER REORGANIZES NEW YORK RUBBER CO.

The Tucker Rubber Co., Buffalo, which bought the assets of the New York Rubber Co., Beacon, N. Y., at a receiver's sale in September, will retain the name of the company, judging from incorporation papers filed at Albany. The New York Rubber Co., Inc., was chartered recently with a capital of 1,000 shares of no par value. Directors are A. Y. Tucker, Morris S. Tremaine, 32 Spencer St., Buffalo, and Schuyler M. Mey, 20 Exchange Place, New York City.

The factory was recently reopened for the manufacture of rubber tubing.

DeLion Loses Suit

The Union Trust Co. of Maryland was recently awarded a verdict of $42,515.94 against John W. Price, president of the DeLion Tire & Rubber Corp., Baltimore, Md. The trust company sued to recover the amount in question as being due on a note for $70,000 signed by Mr. Price as president of the DeLion Company, and for which an assignment of accounts was made.

Rubber Tail Lamp Exhibited

At the Olympia Motor Exhibition in London which closed recently, a rubber tail lamp caused much interest. The lamp, which is known as Rubbolite, is absolutely unbreakable, with the sole exception of the windows which are of glass. In the event of these being broken they can be immediately replaced as a spare set is supplied with each lamp. Vibration of the car is damped out, according to *The Motor*, so that the bulbs do not become damaged. The lamp tapers from the front to rear, and thus the side lights

Rubbolite Tail Lamp

throw illumination on the license plates. There are three models, each designed for a certain car.

Rubbolite is manufactured by Flexible Lamps, Ltd., 102 Wigmore St., London W. 1, who claim that it is the only flexible rubber lamp in the world.

"Lustro" Registered

Binney & Smith Co., New York, recently registered the trade-mark "Lustro" in the U. S. Patent Office under Ser. No. 217,856. The trade-mark has been used since last July for carbon black in dry form for use as a pigment.

H. H. DURR APPOINTED RECEIVER FOR VICTOR

Henry H. Durr, president, was recently appointed receiver of the Victor Rubber Co., Springfield, Ohio, under a bond of $25,000 by Common Pleas Judge F. M. Krapp on the application of Ernst & Ernst and other creditors. Claims total $435,390. The action was brought against the company and trustees, H. B. McGraw, H. J. Robbins, and Harlen C. West. Mr. Durr was authorized to conduct the mat and mechanical rubber departments as a going company. The Victor tire business was sold some time ago to the Hamilton Rubber Mfg. Co., Trent, N. J. Mr. Durr was also empowered to dispose of such assets as he may see fit. Stockholders are not expected to get anything as the company is said by Mr. Durr to be insolvent.

Tube Method Patented

U. S. Patent No. 1,555,587 covering a method and apparatus for manufacturing compression inner tubes has been granted to Walter Kline, Chillicothe, Ohio, assignor of one half to Flora Dickison and one-half to Lon A. Mark and Daniel F. Mark. The method of forming inner tubes on a mandrel one side of which is longitudinally corrugated consists in applying a rubber coating to the corrugated portion of the mandrel, completely covering the mandrel by additional rubber, wrapping the tube, vulcanizing and then removing the wrapper.

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Write for working samples of either National flat braid or Pratt cables (no charge to tire manufacturers) and full information as to our products and service.

Our engineering department tests beads and furnishes complete confidential reports as to their stretch, set and bursting point, without charge. Inquiries solicited regarding this special service.

National Standard Company
Niles, Michigan

In general Factice may be used in any department of the industry in quantities up to 10% of the total compound. It's use will give the following effects:

1.—Increase in general smoothness.
2.—Decrease in tendency to mill burning.
3.—Decrease in tendency to scorching in the tubing machines.
4.—Decrease in the specific gravity of a compound high in mineral fillers.
5.—Imparts a stickiness and ease of working to certain types of low priced reclaimed rubber compounds.
6.—Gives "tackiness" to certain compounds containing dry reclaimed rubber which are used for frictioning cloth.

From "The Practical Side of the Use of Factice."

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NEW GRASSELERATOR 808 ANNOUNCED BY GRASSELLI

The Rubber Service Department of the Grasselli Chemical Co., 347 Madison Ave., New York, recently announced Grasselerator 808, which has just been perfected after a long period of research, application and practical use. At this time when the question of costs is being given serious consideration, Grasselerator 808 is said to be an important factor as it not only provides the minimum cost of accelerator per pound of rubber but also provides reduction in time and temperature of curing and permits reduction of sulphur and activating ingredients.

Unlike any accelerator heretofore used, Grasselerator 808 is said to fill the important demand for one which is more rapid and active than any of the popular accelerators and at the same time is claimed to be safer and avoids the disadvantages of ultra or super accelerators. It is easily incorporated in the batch and does not require special preparation or handling, being a transparent, mobile, amber liquid, miscible with all the common rubber solvents. Reduction of the size of the batch and extra precautions with cooling water are said to be unnecessary.

Grasselerator 808 becomes active only above 110° C. (230° F.) and is efficient at 120° C. (248° F.). Master batches and compounds containing it can be safely stored before vulcanization, the company says. Cements made with the new accelerator will keep indefinitely without gellation. This accelerator gives maximum results in the presence of zinc oxide. Five parts of zinc oxide by weight (calculated on the rubber) are recommended by the company, although this amount may be reduced if lime or magnesia is used.

Grasselerator 808 is practically adapted to universal use. The results obtained in tensiles and stretch are conservative, as are the claims made by the company for its other qualifications.

Charts which show the results obtained with the accelerator and tables giving the stress strain data and showing the unusual properties obtained through the entire extension cycle have been prepared and will be mailed to interested factories. These tables may serve as guides for selecting suitable formulae for development work and in making tests.

Weller Joins du Pont

Sidney L. Weller, formerly rubber chemist and compounder for the Lee Tire & Rubber Co., Conshohocken, Pa., recently entered the employ of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., in the same capacity. Mr. Weller will devote his time to the research study of the use and application of organic accelerators, synthetic colors and pigments in rubber products. In addition to doing pure research work, he will also act as technical demonstrator and consultant to consumers of these du Pont products.

SUGGESTION OF RUBBER DINNER WELL RECEIVED

Quincy Tucker, 126 State St., said recently that favorable replies have been received to his suggestion that the 100 anniversary of the rubber industry in Boston be marked by a dinner about the middle of November. Suggestions have been received that the minimum should be 100 with no limit to the maximum number who shall attend, and it has been recommended that the price of the tickets should not exceed $5.00. It has been further suggested that the dinner be an informal affair.

Interesting and timely rubber subjects will be covered by speakers who are to be selected. Included will be an historical review. Tentatively it has been planned to hold the dinner at the Boston Yacht Club, but if more than 125 make arrangements to attend, it will be held in the new Boston Chamber of Commerce Building.

In a letter to THE RUBBER AGE Mr. Tucker called attention to the fact he was the first one to suggest a plan whereby American owned plantations could be financed by a voluntary tax. A bulletin sent out April 2 last by Mr. Tucker contained this suggestion.

Sails for South America

F. K. Espenhain, vice president of the Goodyear Tire & Rubber Co., Akron, left recently for a trip to South America on the *S.S. Vauban.* He was accompanied by his wife.

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DUTCH SEEK TO PROMOTE USE OF RUBBER FLOORING

A more general application of rubber flooring in Holland is considerably checked by the difficulties experienced in some cases with the fixing of the ruber on the floor. Indeed the consequence of those difficulties is that many architects, although undoubtedly interested in rubber flooring, hesitate to install this commodity for fear of disappointments and in that way a very important use of rubber is considerably reduced.

With a view to tracing causes of the difficulties of which at present little or nothing is known, and to find practical means to overcome these troubles, an Investigation Committee has been established. This committee is fully representative, including also those who have rather a technical-scientific interest in the subject.

Members of the committee are:

Dr. A. van Rossem, Director of the Government Rubber Institute, Delft. Chairman. J. de Bruyn, Technical Adviser of the Netherlands Trading Company, Amsterdam. M. A. van Nieukerken, Architect, The Hague. E. L. C. Schiff, Jr., Director of the rubber company "Vredestein", Loosduinen. W. van der Tak, Head of the Technical Department of the Netherlands Bank, Amsterdam. Prof. Chr. K. Visser, Professor in the Technical University of Delft. A. A. de Vries, Director of the rubber company N. V. Nofa Eboniet-en Rubber-fabrieken, Amsterdam. J. G. Fol, Secretary of the Propaganda Department of the International Association for Rubber—and other Cultivations in the Netherlands Indies, The Hague; Secretary.

Work Planned by the Committee

First of all the committee will pay attention to the method of fixing various types (hard and soft) of rubber flooring on the floors now in use (concrete, wood, etc.) Although this investigation exhausts the subject by no means the Committee thinks it appropriate to confine provisionally its task in the way described and to leave further questions in connection with rubber flooring for future investigation.

In the opinion of the committee successful results of its activities will have to be published for the benefit of all interested in rubber flooring. There is no doubt that the more information and data are available the more the task of the committee will be facilitated. Therefore a strong appeal is made to everybody interested in rubber flooring to support the committee by supplying this information. It would be of great use if all architects would give full particulars on the rubber flooring laid in their building and the experience obtained with it. Of no less importance it would be if rubber manufacturers would inform the committee of their experience with the floors on which the rubber was laid.

The committee wil be glad to investigate any adhesive received, provided its composition and the method of its preparation are given and the committee will not be bound to secrecy in this respect. As the committee wants to give the widest publicity to the results of its activities it is obvious that no other policy can be adopted.

All correspondence to the committee should be addressed to the Secretary: J. G. Fol, 39 Noordeinde, The Hague (Holland).

Reed Accounting Approved

The first and final accounting of J. M. Eckels, receiver of the Reed Rubber Co., Toledo, Ohio, was submitted recently and accepted by the Court of Common Pleas of Lucas County, Ohio. The Reed Rubber Co. manufactured toy balloons. The receiver was appointed the latter part of 1924. Mr. Eckels is and has for the past eight years been Toledo branch manager of The Ohio Rubber & Textile Co., Cleveland, with several factories manufacturing mechanical, molded rubber goods as well as textiles.

DUNLOP EMPLOYS 28,000 IN ALL ITS FACTORIES

Interesting figures just made public regarding the Dunlop rubber interests show that there are over 28,000 people employed in the various Dunlop rubber companies throughout the world. In Great Britain 12,000 are working at Fort Dunlop, where the plant covers 420 acres. The Australian company employs 2,000, while the other 14,000 are spread over plants in France, America, Canada, and Japan.

The average weekly output of the English concern is 52,000 automobile tires (covers), although it is at present making 70,000 a week, 150,000 inner tubes. 16,000 motorcycle tires, 70,000 bicycle tires, 4,000 solid vehicle tires, and 10,000 dozen golf balls. The standard equipment on 95 per cent of the automobiles is made by Dunlop.

Report of Rims Approved and Rejected for Years 1920, 1921, 1922, 1923, 1924 and 1925

	1920	1921	1922
Total No. Rims Inspected	15,426,320	10,860,046	17,789,381
Total No. Rims Approved	12,860,724	9,175,039	16,281,583
Number of Rims Rejected	2,565,596	1,685,007	1,507,798

Rims approved and branded by the Association are classified in sizes as follows:

	1923	1924	1925 (9 months)
Clincher Rims Inspected	17,089,970	12,755,518	5,158,922
Clincher Rims Rejected	2,278,325	1,416,536	589,603
Clincher Rims Approved	14,811,645	11,338,982	4,569,319
Straight Side Rims Approved	8,330,317	10,524,833	15,072,665
Total Rims Approved	23,141,962	21,863,815	19,641,984

	1920		1921		1922		1923		1924		1925 1st 9 mos.	
SIZE	Number	Pct.	Number	Pct.	Number	Pct.	Number	Pct.	Number	Pct.	Number	Pct.
26x2½ CL	....	0.0	1,157	0.0	....	..	....	..	....	..	....	..
24x3 CL	1,739	..	....	..	....	..	....	..	2,679	..	10,536	0.1
26x3 CL	69,572	0.5	12,629	0.1	16,730	0.1	36,863	0.1	60,352	0.3	73,466	0.4
28x3 CL	119,317	0.9	26,902	0.3	26,902	0.3	73,680	0.3	25,343	0.1	2,581	0.0
30x3 CL	1,365,757	10.6	532,034	5.8	532,034	5.8	1,009,856	4.4	601,517	2.9	197,441	1.0
30x3½ CL	5,634,663	43.8	5,588,656	60.9	5,588,656	60.9	11,204,235	48.4	9,675,744	44.4	3,721,104	19.0
31x4 CL	....	..	....	..	....	..	1,594,862	6.9	848,610	3.9	564,191	2.9
25x3½ SS	....	..	....	..	....	..	....	..	645	0.0	460	0.0
27x3½ SS	....	..	....	..	....	..	33,381	0.1	3,582	0.0	2,372	0.0
28x3½ SS	....	..	....	..	....	..	14,070	0.1	1,050,904	4.8	5,953,786	30.3
29x3½ SS	....	..	....	..	....	..	....	..	61,189	0.3	144,390	0.7
30x3½ SS	....	..	172,238	1.8	1,632,809	10.0	3,403,190	14.7	2,580,146	11.3	539,156	2.2
32x3½ SS	1,183,251	9.2	323,784	3.5	186,937	1.1	143,575	0.6	64,577	0.3	20,729	0.1
28x4 SS	....	..	....	..	....	..	17,048	0.1	949,671	4.4	2,398,346	12.2
28x4 AP	....	..	....	..	....	..	703	0.0	45	0.0	....	..
29x4 SS	....	..	....	..	....	..	2,126	0.0	717,284	3.3	1,245,927	6.3
30x4 SS	....	..	....	..	....	..	41	0.0	324,000	1.5	287,464	1.5
31x4 SS	....	..	....	..	4,319	0.0	109,705	0.5	28,879	0.1	1,515	0.0
32x4 SS	1,311,244	10.2	1,216,475	13.7	3,041,559	18.7	3,014,093	13.0	1,370,681	6.3	232,638	1.2
33x4 SS	1,041,652	8.2	487,206	5.3	411,621	2.5	211,437	1.0	112,106	0.5	18,162	0.1
34x4 SS	127,584	1.0	32,041	0.3	59,696	0.4	20,438	0.1	2,690	0.0	503	0.0
29x4½ SS	....	..	....	..	5,410	0.0	67,919	0.3	353,514	1.6	404,705	2.1
30x4¼ SS	....	..	....	..	....	..	478	0.0	569,574	2.7	1,254,592	6.4
31x4½ SS	....	..	....	..	....	..	67	0.0	232,750	1.1	245,976	1.3
32x4½ SS	624,473	5.0	326,412	3.5	1,065,220	6.6	1,438,610	6.2	1,318,609	6.0	501,405	2.6
33x4¼ SS	874	0.0	....	..	79,787	0.5	80,892	0.4	2,629	0.0	1,854	0.0
34x4½ SS	878,097	6.8	346,254	3.7	458,478	2.8	466,438	2.1	212,158	1.0	83,311	0.4
36x4½ SS	38,601	0.3	8,323	0.1	11,265	0.1	4,559	0.0	1,995	0.0	154	0.0
30x5 SS	....	..	....	..	....	..	....	..	155,245	0.7	294,340	1.1
31x5 SS	....	..	....	..	....	..	23	0.0	169,978	0.8	397,198	2.0
33x6 SS	....	..	....	..	....	..	....	..	10,914	0.0	58,585	0.3
30x5 Trk	....	..	....	..	508	0.0	5,548	0.0	146,888	0.7	681,302	3.5
31x5 Trk.	....	..	....	0.5	....	..	....	..	50	0.0	....	..
34x5 Trk.	43,463	0.3	48,637	..	112,234	0.6	141,278	0.6	110,185	0.5	86,133	0.4
32x6 Trk.	....	..	....	..	676	0.0	5,597	0.0	32,441	0.2	115,386	0.6
36x6 Trk.	123,659	1.0	2,928	0.0	11,906	0.1	22,750	0.1	31,934	0.1	53,636	0.3
34x7 Trk.	....	..	....	..	282	0.0	2,084	0.0	5,914	0.0	20,493	0.1
38x7 Trk.	48,603	0.4	1,151	0.0	8,102	0.0	5,407	0.0	8,881	0.0	7,211	0.0
36x8 Trk.	....	..	....	..	353	0.0	3,019	0.0	1,981	0.0	9,227	0.0
40x8 Trk.	38,182	0.3	1,127	0.0	4,795	0.0	6,442	0.0	5,122	0.0	10,582	0.1
44x10 Trk.	2,431	0.0	190	0.0	....	..	....	..	....	..	1,177	0.0
Millimeters	191,394	1.5	1,895	0.0	6,755	0.0	909	0.0	....	..	....	..
Total	12,862,556	..	9,175,039	..	16,297,785	..	23,141,968	..	21,863,815	..	19,641,984	100.0

KEY:—"Ap" Airplane; "SS" Straightside; "CL" Clincher.

NOTE:—Supervisory inspection on all straightside rims started June 1, 1922. Since that date all rejections are clincher rims.

PALMERTON TO SPEAK AT N.T.D.A. CONVENTION

Among the speakers at the annual convention of the National Tire Dealers' Association scheduled for November 17 to 19, at the Hotel Chase, St. Louis, Mo., will be Paul L. Palmerton, chief of the Rubber Division, Department of Commerce, and Ray Hudson, chief of the Division of Simplified Practice.

Following registration on the morning of the 17th, a combined meeting of the association directors and members will be held with the convention committee of the Associated Tire Dealers of St. Louis. The first general session of the convention will be called at two p.m. on the 17th, and will be opened by George J. Burger, president of the N.T.D.A. The chief speaker at this session will be Ray Hudson of the Department of Commerce. At 4 p.m. on the same day a business session will be held.

The address of P. L. Palmerton of the Department of Commerce is a feature of the second day's program. Reports of the president, directors and various committees will also be received at an executive business session which follows Mr. Palmerton's address. A trip through the Cupples Co. tire factory will be made during the afternoon, while a banquet and entertainment will be held in the evening.

Business meetings will be held on the morning and afternoon of November 19. Election of officers for the ensuing year will be held at the afternoon session. At a banquet and entertainment which closes the week's program, addresses will be made by President George Burger, by the newly elected president, and by Robert E. Lee, manager of the St. Louis Automobile Dealers' Assn.

RUBBER STATIONERY

Recently the Akron Real Estate Board wrote a letter on rubber to every real estate man in Ohio, calling attention to its 16th annual convention held Oct. 14 to 16. The letters were printed on thin sheets of bright colored Para rubber and bore the name and official insignia of the Akron Real Estate Board. In connection with the convention, the realtors visited some of the rubber factories.

Transmission Belt Patented

The B. F. Goodrich Co., Akron, Ohio, has been assigned U. S. Patent No. 1,530,774 granted to Irwin F. Kepler, Akron, and covering a transmission belt. The side-driving belt consists primarily of thread or fabric elements and rubber vulcanized together. The belt is surfaced at its sides and inner periphery with bias fabric forming terminal edges at the side edges of the outer periphery of the belt. An inextensible band of longitudinal threads is located substantially in the inner half of the belt, together with a rubber filler lying between the wings of the belt and wholly outside of its fabric or thread element in a radial direction.

RUBBER ROADWAYS ISSUE REPORT ON EXPERIMENTS

(Special to THE RUBBER AGE*)*

That use of rubber for roadway and pavement surfaces has not yet developed beyond the experimental stage, but that a certain amount of progress has been made may be gathered from the latest report of Rubber Roadways, Ltd., a company formed in England ten years ago to explore the possibilities of this outlet.

The campany is carrying out experiments with three kinds of blocks—namely, rectangular blocks with ribbed sides, rectangular with smooth sides, and interlocking blocks—in the boroughs of Holborn and Southwark, London. Although the tests made have been satisfactory up to a point, further experience is necessary before final opinions can be formed.

The board is still prepared to consider applications from railway companies, public authorities, and similar bodies for free grants of rubber stair treads for testing purposes. It will be recalled that the rubber blocks laid around the Cenotaph in London had to be removed owing to their inability to withstand the dragging tendency of traffic, but other methods of laying have given better results.

C. B. Reynolds Joins Racine

C. B. Reynolds, formerly General credit manager for the B. F. Goodrich Rubber Co., Akron, was recently elected treasurer of the Racine Horseshoe Tire Co., Racine, Wis. Mr. Reynolds was with Goodrich for 16 years.

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U. S. SLACKENED DEMAND OFFSET BY CONTINENT

(Special to THE RUBBER AGE*)*

British rubber trade returns for August indicate the degree to which demand for the Continent was maintained, shipments there having been almost sufficient to offset the diminished demand—purely seasonal—from the U.S.A. Quantities and values of re-exports to the principal consuming countries compared with those for the corresponding period of 1924 are as follows:

	August. 1924.	August. 1925	August. 1924.	August. 1925.
	Tons.			
Russia	nil	89	nil	£38,100
Germany	685	860	77,860	352,124
France	435	1,000	50,686	438,068
Italy	176	299	20,192	135,473
U. S. A. 2,427		1,491	305,148	521,313
Canada	176	78	18,400	28,310

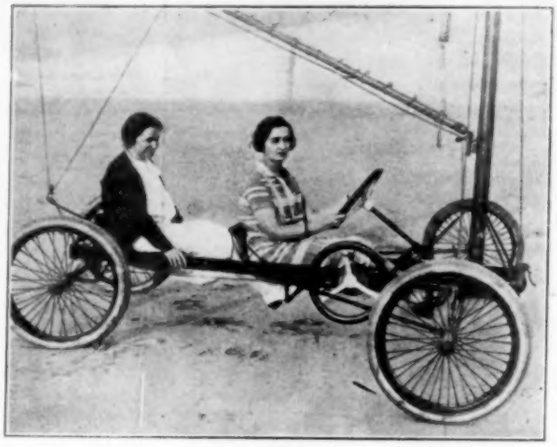
In the aggregate re-exports amounted to 4,166 tons, against 4,247 tons, but, in spite of the slightly smaller total, a striking advance occurred in the value, which rose from £514,704 ($2,583,520) to £1,637,813 ($8,189,065). This was, of course, due to the fact that throughout August this year produce was marketed at more than 3s (75 cents) per lb., in comparison with little more than 1s. (25 cents) in the corresponding month last year.

Although a section of the London press affirms that the recent spasm in forward quotations was due to "paper" speculation almost entirely, in trade circles it is held that there is a steady current of forward buying by actual consumers, who are forced from motives of self-preservation to cover their estimated needs up to at least March next.

The attitude of producers has also to be considered. When commodity prices started to really boom last April, certain cautious directorates advised that they had made contracts for forward deliveries at what looked then like advantageous prices. Later others transacted similar business at even better rates, but it is now generally preached that in the interests of stockholders their directors should adopt a policy of "wait and see," and forward contracts are being strongly deprecated.

These factors constitute a somewhat discouraging outlook for the average consumer, and it is understood that when Parliament reassembles in London a long string of questions and arranged deputations will have been accumulated on this perplexed point of rubber supplies and high prices. Certainly the present quotations for forward deliveries up to June of next year constitute a serious outlook to manufacturers.

A BEACH YACHT
This vehicle, which is equipped with pneumatic tires, recently made its appearance on Oyambre Beach in Spain. Propelled by the wind, it can attain a speed of 50 miles an hour.



Armour Tire Formed

The Armour Tire & Rubber Co., Dayton, Ohio, was recently incoporated to manufacture and sell all kinds of rubber products by Carl L. Cappel, S. V. Jordan, George E. Zimmerman, J. B. Deady and J. A. Wortman.

Appleby Joins India

J. H. Appleby has joined the India Tire & Rubber Co., Akron, Ohio, as district manager, and will have jurisdiction over Chicago and Milwaukee territories. Mr. Applyby was formerly sales manager of the Denman-Meyers Cord Tire Co. India Tire & Rubber Co. also announces that L. E. Marlowe and E. C. Bryan, formerly of the sales department of the Denman-Meyers Cord Tire Co., have joined the India sales organization.

Rubber Process Patented

The Naugatuck Chemical Co., Naugatuck, Conn., was recently assigned U. S. Patent No. 1,556,415 granted to Sidney M. Cadwell and covering a process for retarding the deterioration of rubber. The process comprises treating vulcanized rubber with an agent substantially unable to activate oxygen but adapted to absorb appreciable amounts of activated oxygen.

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DEPARTMENT OF AGRICULTURE URGES RUBBER INVESTORS TO BE CAUTIOUS

Outlook in Tropical America is Better for Undertakings by Resident Land Owners than for Those of Others, Says Departmet, Pointing to Early Failures

Advancing prices of rubber and the possibility of complete dependence upon the remote East Indies for this essential product have stimulated private and public interest in the feasibility of rubber production in Florida or in tropical America.

The United States Department of Agriculture in answer to the many inquiries being received calls attention to the earlier failures with rubber plantations in tropical America. These failures show the need of caution in investing in rubber enterprises. On the other hand, they afford no reason for believing that production is not practicable if methods adapted to the local conditions are developed and applied.

The outlook in tropical America, however, is better for undertakings by resident land owners, says the department, than for the more costly projects of nonresident land owners on account of the necessity of adjustments to meet local economic conditions.

Experiments with Hevea

In the earlier plantations in Mexico and Central America the native rubber trees, Castilla elastica and several related species, were used but these did not respond to continuous tapping as does the Hevea or Para rubber tree of Brazil, which proved successful in the East Indies. Experiments are now being made with Hevea and other tropical rubber plants in southern Florida, Haiti, and the Canal Zone by the Bureau of Plant Industry to determine the range of adaptation of the different species. The northern limit for Hevea is still unknown. A small planting near the north coast of Haiti now about 20 years old has grown well and produces good rubber. The flow of latex is greatly reduced in the winter months but a rest period does not injure the trees. Correspondents in Mexico, Cuba or Porto Rico are encouraged by the department to make small plantings of Hevea in sheltered places where the native vegetation does not suffer too severely from drought.

Plantings Made 20 Years Ago

Several small plantings of Hevea were made in Central America about 20 years ago along with the Castilla plantations but later were abandoned. The Hevea trees appear to have grown well even where completely neglected though they have not been tapped by suitable methods to determine the yields of rubber. Very little latex is obtained from Hevea by the methods of tapping that are used for Castilla and the department finds that such attempts have given rise to reports of Hevea trees that do not contain rubber.

Experimental tapping has been done recently in Haiti by the department. The production of individual trees recorded for several months shows yields like those of the East Indian plantations but with a shorter tapping season. Tests have shown that the rubber is of good quality. Labor is abundant in Haiti and the production of rubber may be feasible but the fertile districts are densely populated and do not afford large tracts of unused land for plantation enterprises. Smaller units might be organized and production by native farmers encouraged or plantation areas might be found in the adjacent Dominican Republic. The trees may be expected to thrive as well or better in many districts in Central America or in southern Mexico. In some districts labor is obtainable and might be adequate for a gradual plantation development if too rapid expansion were avoided.

Rubber is obtainable from many species of plants belonging to different families and adapted to different conditions not only in the humid tropics but in temperate or dry regions. With suitable methods of extraction it might be possible to produce rubber from Castilla or from some other plant more rapidly or with less labor than from Hevea. The possibilities of different systems of production are being investigated in the United States and in foreign countries.

Some of the tropical species of rubber producing plants grow well in Florida and some of the dry-country species in California, but the department gives no assurance that commercial cultivation would be profitable in competition with the East Indian rubber industry. Until more information is available correspondents are not advised to make large scale plantings or to invest in rubber planting enterprises unless they have a special interest in working out the experimental problem. There is a large field of experimental interest for mechanical inventions or plant improvements to facilitate the production of rubber.

Price an Important Factor

The price to be expected in the future is one of the chief factors in judging the feasibility of any new undertaking. A serious shortage may be felt in a few years if the use of rubber in other parts of the world should increase as rapidly as in the United States. Higher prices are already stimulating a further plantation development in the East Indies under the system of Oriental contract labor and in some districts the natives also are planting rubber.

Modified plantation systems without contract labor probably can be worked out that will prove profitable in tropical America but claims of assured income from stock selling promotions are always to be distrusted.

Revere Assigned Process

The Revere Rubber Co., Chelsea, Mass., has been assigned U. S. Patent No. 1,555,131 granted to John McGavack and covering a process for preparing rubber-containing plastics. The patent covers the product of the reaction of rubber, an aldehyde, a phenol and a holgen.

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Thats what THE RUBBER AGE want 'ads' are! Try one when you need more equipment or want to dispose of old machinery.

PUBLISH RESULTS OF 1923 RUBBER INDUSTRY CENSUS

The Bureau of the Census recently issued a pamphlet on the results of the 1923 census of the rubber industry, including tires and tubes, boots and shoes and miscellaneous rubber goods. For 1923, 529 establishments were reported, compared with 496 in 1921, 477 in 1919 and 342 in 1914, an increase over 1914 of 45 per cent. Persons engaged in the rubber industry, including firm members and employees numbered 160,161, a gain of 40.4 per cent over 1914. Salaries in 1923 were $48,963,201 and wages, $182,084,056, a gain of 190.3 and 179.9 per cent respectively as compared with 1914. The cost of materials rose from $163,034,713 in 1914 to $501,162,768 in 1923, a gain of 131.8 per cent.

The value of products manufactured in 1923 was $958,517,634, compared with $300,993,796 in 1914, a gain of 134.2 per cent. In 1923, 2,243,367 tons of coal were used, compared with 1,211,725 tons in 1914.

In the report of the Bureau of the Census the following information is also given in tables: wage earners, by months, for the United States, 1914 to 1923, and for selected states, 1923; size of establishments by value of products, 1923, 1921 and 1919; prime movers by type, number and horsepower, for the United States, 1923, 1919 and 1914; products by class, quantity and value, 1923, 1921 and 1919.

Detailed statistics of each division, i. e., tires and tubes, boots and shoes, and rubber goods, not elsewhere classified, are also given in the pamphlet.

"Rubber Man" Helps Montana Loggers

Loggers in the lumber camps of Montana and Oregon are using what they call a "rubber man" to operate one end of a two-man cross cut saw. The "rubber man" is made from an automobile inner tube and one end is attached to a stake driven into the ground. The handle is taken off one end of the saw and a steel hook fastened to the free end of the rubber strip, is inserted in the holes where the saw handle was attached.

The sawyer pulls against the tube and the tube pulls the saw back at the end of each stroke. By regulating the length of the tube and the distance of the stake, it is possible to get a full length stroke. A light cut can be made when the logger pulls the saw toward himself. On the return stroke the rubber strip is resilient enough to permit him to ride the saw and make a heavy cut. Although the "rubber man" is not claimed to be as good as a hard-working partner, he is said to be much better than a poor one.

Sale of Balloons Doubled

According to executives of the Miller Rubber Co., Akron, twice as many low pressure tires have been sold thus far this year as in the entire twelve months of 1924. Improved methods of manufacture have done much to make the balloon tire as popular as the older type.

General Statistics for the United States: 1914 to 1923

	1923	1921	1919	1914	Per cent of increase or decrease (—) 1921-1923	1914-1921
Number of establishments	529	496	477	342	6.7	45.0
Persons engaged	160,161	124,738	206,202	88,821	28.4	40.4
Proprietors and firm members	107	95	98	87	..	..
Salaried officers and employees	22,186	21,370	47,555	14,712	3.8	45.3
Wage earners (average number)	137,868	103,273	158,549	74,022	33.5	39.5
Capital			$960,070,726	$267,671,422	..	..
Rent and taxes			$44,445,822	$2,226,322	..	..
Salaries and wages	$231,047,257	$170,868,015	$278,991,545	$60,445,980	35.2	182.7
Salaries	$48,963,201	$47,255,142	$85,228,456	$16,278,578	3.6	190.3
Wages	$182,084,056	$123,612,873	$193,763,089	$44,167,402	47.3	179.9
Paid for contract work	$867,103	$279,584	$3,676,318	$408,851	210.1	—31.6
Cost of materials (including also fuel and mill supplies)	$501,162,768	$377,879,372	$594,343,590	$163,034,713	32.6	131.8
Value of products	$958,517,634	$704,903,133	$1138,216,019	$300,993,796	36.0	134.2
Value added by manufacture	$457,354,866	$327,023,761	$543,872,429	$137,959,083	39.9	137.0
Primary horsepower	605,634		429,273	199,242	..	..
Coal consumed (short tons)	2,243,367		2,303,607	1,211,725	..	..

London Stock Again Low

The recent activity in the London crude rubber market served to call attention anew to the shortage in rubber stocks there. It is remarked that the easing of the export restrictions at the beginning of August has done little up to the present to relieve the scarcity. Shipments from the East have not kept pace with the continually increasing demand for rubber, and the stocks in London now are only about 5,162 tons as compared with 43,000 tons a year ago. This is attributed to a great extent to urgent orders from the United States.

The prospect for any early increase in supplies is not regarded as very favorable owing to the scarcity of labor on many of the rubber estates. Some of these are said to be unable even to produce the present restricted allowance.

Schall Joins C. J. Osborn

The C. J. Osborn Co., 132 Nassau St., New York, dealers in carbon black, red oxide, lithopone, lampblack, barytes and zinc oxides, recently announced that S. H. P. Schall, formerly of Gabriel & Schall, has joined their organization. Mr. Schall will take complete charge of the "White Department" and assures the trade that the high standard established by Gabriel & Schall will be fully maintained.

MILLER ANNOUNCES PLAN OF STOCK REARRANGEMENT

Details of the proposed reorganization plan of the Miller Rubber Co., Akron, approved recently at a special meeting of stockholders on October 19, were announced in a letter previously sent to stockholders by Jacob Pfeiffer, president. Mr. Pfeiffer's letter follows:

"It is proposed (subject to the plan of reorganization hereinafter referred to) to now sell $4,000,000 par value of the unissued 8 per cent cumulative preferred stock of the company at $103.50 per share—first offering the same to the common stock holders of the Company, and also to change capitalization of the company so that it will have a total authorized issue of 600,000 shares of capital stock—400,000 of common stock without par value and 200,000 of 8 per cent cumulative preferred stock. Under the proposed plan, the terms and provisions of the present preferred stock and the par value thereof will in no way be changed or affected but the authorized amount thereof will be reduced to 200,000 shares. The holders of the common stock will receive five shares of the new no-par common stock of the company in exchange for each share of the present outstanding common stock.

"You are hereby offered for subscription, at the price of $103 per share, such proportion of the additional issue of the above mentioned 40,000 shares of preferred stock on a basis of 5¼ shares of your present holdings of common for approximately 4 shares of new preferred stock. The board of directors deem it to the best interests of this company and its stockholders that the plan of re-organization herein referred to be adopted."

Otis & Co., with main offices in Cleveland and branch offices in nine other cities, is offering the Miller stock at $103.50 a share, with dividends accruing from date of issue, to yield about 7.73 per cent.

Dayton May Build in Texas

An unconfirmed rumor was recently heard to the effect that the Dayton Rubber Mfg. Co., Dayton, Ohio, plans to build a factory in Texas, either in Waco or Houston. Two-thirds of the Dayton production is said to be distributed by the Hicks Rubber Co., Waco, which maintains 23 stores in the state and who plan to open 20 more during the coming year. One-thirteenth of all tires sold in Texas are said to be distributed by the Hicks Rubber Co.

Predicts Balloon Supremacy

At the recent sales convention of the General Tire & Rubber Co., Akron, William O'Neill, president, predicted that "within two years the balloon tire will entirely supplant the high pressure type." The reasons ascribed by Mr. O'Neill for the eventual supremacy of the low pressure tire are that balloons grip the road better, are less likely to skid, not so apt to blow out because they need less air and generate less heat and finally that they give the motorist greater comfort.

GENERAL STARTS WORK ON TWO NEW ADDITIONS

The General Tire & Rubber Co., Akron, recently let a contract for two more additions to the factory. One will be an extension to the present main building and another a wing to the south. Construction will begin at once.

When these extensions have been completed General will have doubled its plant area in a period of about three years. The immediate effect will be to increase factory production capacity 50 per cent.

The following statement is issued by General officials, relative to the building project and the business outlook for some time to come:—

"Business generally throughout the country is still growing. In tires, of course, there is a disturbed crude rubber market, with high prices for raw materials and incidental rises in the price of tires, but tires themselves are much better than ever before and are still much cheaper than almost any commodity the public uses.

"As a company we claim one advantage over car-equipment tire manufacturers in planning the future. We build strictly on consumer demand for Generals, which are all distributed through the dealer to the actual car owner. Thus we have no peaks or valleys in factory output, for we are in no way dependent on the manufacture or sale of new cars. The 17,000,000 cars already running and wearing out tires make our dealers' market. Incidentally car makers are optimistic over the outlook for big production in 1926.

"We do not anticipate any great shortage of crude rubber for the next year,—that is, any such shortage as would compel tire makers to curtail production for lack of raw material. But there will continue to be price flurries and the price of crude will be up until the world's rubber plantations have been substantially increased."

T. L. Moore Promoted

T. L. Moore, formerly southern district manager of the General Tire & Rubber Co., Akron, has been appointed southern manager of transportation sales for the company. H. D. Taylor succeeds him as southern district manager, with offices in Atlanta.

Made Ajax Sales Manager

L. M. Van Riper, vice president in charge of the sales of the Racine Rubber Co., Racine, Wis., has been made general sales manager of the Ajax Rubber Co., New York. Mr. Van Riper's service with Ajax covers many years in important positions, including western sales manager and district manager. W. R. Flournoy, who has been assistant to the vice president in charge of the sales for the Ajax company, has been appointed assistant general sales manager. H. Kardos, who has been Mr. Van Riper's assistant at the Racine company, has been made assistant sales manager of that company.

RUBBER PRODUCTS SEEN AT N. Y. ELECTRIC SHOW

Although rubber products did not play as prominent a part at the New York Electrical and Industrial Exposition held in Grand Central Palace, Oct. 14 to 24, as they did in the recent chemical show, they were in evidence if one looked for them. Many of the exhibits used inflated balloons for decorative or demonstration purposes to show the current of air delivered by an electric blower; as insulation, rubber also played an important but inconspicuous part; but it was also to be seen employed in other ways, i.e., in storage battery boxes and vents, in molded lamp sockets and other molded parts.

The exhibit of the Ileite Electric Manufacturing Corp. consisted wholly of rubber and bakelite electrical accessories. This company, which has a factory at Tuckahoe, N. Y., and occupies the former factory of the Malone Rubber Co., Malone, N. Y., displayed a new product called "Jiffy Insulators" which are made of flexible molded rubber for the insulation of wiring in household articles such as vacuum cleaners, lamps, heaters, etc.

Fisk Assigned Patents

The Fisk Rubber Co., Chicopee Falls, Mass., was recently assigned four United States patents covering a tire mold invented by Thomas Midgley. The patents are Nos. 1,554,015, 1,554,016, 1,554,017 and 1,554,018, which cover a mold for tire casings.

How Should Rubber be Dried ?

The Rubber Shortage demands economy in crude and reclaim preparation.

Carrier Drying Systems,

including the well known Hunter Process, produce uninjured and uniformly dried stock. These Systems assure reduction in time, space, labor and milling costs.

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MOST BRITISH CARS ARE NOW BUILT FOR BALLOONS

(Special to THE RUBBER AGE*)*

In regard to medium-sized automobiles in Britian (cars having engines between 2 and 3½ litres capacity) there are not nearly so many now fitting balloon tires without redesigning the steering details suitably for them as was the case a year ago. The balloon tire, as applied to middle-sized cars, can now be judged practically on its merits without its case being prejudiced by ancillary factors. If the given car has poor suspension and sluggish performance one may pass the balloon on the understanding that one is not enjoying motoring as it should be experienced today—because one has the wrong car. In other words, balloons can hide gross faults.

With regard to well-designed cars of medium size, medium power category, with flexible, efficient engines, not necessarily of high cost, also good suspension and steering, the balloon tire has undoubtedly been found a handicap in Britian. It deadens performance, and some experts declare it actually spoils the suspension, as by exaggerating the slightest tendency for the car to "bounce" when driven over badly-surfaced roads at high speeds.

In a big car with a large engine there seems to be no European-made example which is appreciably improved by the use of balloons. There are a number of big American cars which perform agreeably on them, but there are others which do not. In the latter greater physical effort is necessary for the steering.

British manufacturers are now endeavoring to prove that if a car is large or medium-sized, and is properly designed and built, balloon tires are unnecessary. A tendency is now observable to fit wire wheels of the Dunlop type, in conjunction with normal size tires, to large and middle-sized cars to a greater extent than has obtained at any time since the war, which, chiefly on the grounds of cost, has caused sundry manufacturers to refrain from fitting this class of wheel. The weight of the car is taken from the top; in other words, the wire wheel itself assists suspension, yet does not deaden performance.

It is impossible to say whether at some future date there will be a compromise in size between the balloon and the normal size tire. The modern cord tire, however, is usualy so excellent a production that in most circumstances it is preferred by the British motorist.

Free Seeds for Filipinos

A bill appropriating $30,000 for the free distribution of rubber seeds to the farmers was recently passed by the Philippine Senate. The sponsors of the bill hope to encourage the farmers in this way to develop rubber planting on a large scale. The bill is now in the House.

LITCHFIELD PREDICTS A FURTHER SHORTAGE

P. W. Litchfield, vice-president of the Goodyear Tire & Rubber Co., who recently returned from Europe, where he studied the rubber market, says that the only hope of alleviating the shortage of rubber lies in increasing the available supply. Relief from the shortage, he stated, cannot be expected for the next five years, which is the mimimum time required for a new harvest.

"European rubber factories are beginning to expand," Litchfield continued. "The increase in demand for crude rubber abroad is much greater than it is in America. At the same time the increased European demand for crude rubber has resulted in lessening the baneful effect of the Stevenson Restriction Act, which is primarily responsible for the shortage. The Stevenson Act will very likely remain in force but the steady increase in demand for crude rubber will soon mean that the entire rubber supply will be released. The law will then be practically non-effective until the price drops to the low, 33 cents a pound, when it will again place an embargo on English rubber exports."

Reynolds Joins Racine

C. B. Reynolds, formerly general credit manager for the B. F. Goodrich Co., Akron, has been elected treasurer of the Racine Horseshoe Tire Co., Racine, Wisc.

H. MUEHLSTEIN & COMPANY, Inc.

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"TIRE" BRAND SUPERFINE Rubber Sulphur
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Specify "Tire" and "Tube" Brands on your orders. This will assure you of Stauffer quality and service.

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MOTOR INTERESTS URGE TIRE STANDARDIZATION

There is a renewed prospect of the standardization and reduction in the number of sizes of balloon tires through the activities of the Society of Automotive Engineers, whose council last spring re-established the tire and rim division of its standards committee for the purpose of considering the advisability of attempting to accomplish this end. A questionnaire on the subject was sent to all automobile manufacturers and in response thirty well known companies have expressed themselves as favoring a definite standardization program on balloon and semi-balloon tires. Most of them indicated that they would be guided in the future selection of their equipment tires by such standards when adopted.

Commenting on the present situation, a number said that there are too many sizes. Other comments were that the multiplicity of sizes and types causes great waste and should not be allowed to continue, that tire design should suit car design, and that the 20-inch wheel is preferred.

Among suggestions made for improving the situation were that the tread contour and the rubber mixture be improved, that the number of plies of fabric in the tire be stamped or molded on the tire, that there should be more plies and a compromise between high pressure and extremely low pressure, that the tire and rim weights be standardized as well as sizes, that the wheel diameter be standardized at 20 inches and the tire sections limited to 5, 6 and 6.75 inches, and that the variation in size from the standardized sizes be limited to 5 per cent instead of the present 10 per cent.

The foregoing comments and suggestions from car manufacturers have been laid before the members of the tire and rim division of the society and after they have had time to consider them sufficiently, a meeting of the division is to be called to discuss the matter and take some action.

Rubber Mold Patented

Paramount Rubber Consolidated, Inc., Tuckahoe, N. Y., has been assigned U. S. Patent No. 1,553,560 covering a mold for rubber articles. The patent covers a pair of mold members, each comprising a holder and a series of mold blocks therein. The mold blocks of the upper member are tight in the holder and the blocks of the lower member are loose in the holder. They are arranged to communicate with a passageway in the lower mold member irrespective of the angular position of the blocks therein.

"Velvet" Registered

The Rubberized Sheeting & Specialty Co., Inc., New York City, recently registered the trade-mark "Velvet Finish" in the U. S. Patent Office under No. 203,438. The trade-mark has been used on rubber sheeting since November, 1917. The registration is not subject to opposition.

N. J. ZINC STARTS SUIT ON LITHOPONE PATENTS

Alleging infringment of five patents covering improvements in the manufacture of lithopone, the New Jersey Zinc Co. has filed a bill for injunction in the United States District Court here against E. I. duPont de Nemours & Co. The bill charges that the duPont company is using and causing to be used methods of manufacturing lithopone embodying inventions claimed by the plaintiff. The plaintiff seeks an injunction and preliminary injunction, pending the suit, enjoinging duPont from infringing directly or indirectly on the rights of the plaintiff and infringing on the latter's patent. Costs and damages and such other relief as the circumstances may require are also asked.

Mohawk Holds Sales Meeting

Several hundred salesmen and dealers of the Mohawk Rubber Co., Akron, were in attendance at the recent annual sales convention at the company's factory. S. S. Miller, president; J. F. Jones, sales manager; and R. M. Shively, advertising manager, delivered addresses. Entertainment included a banquet at the Congress Lake Club.

Joins Rubber Service

W. Peter Horst recently resigned his position with the National Aniline & Chemical Co. to accept one with the Rubber Service Laboratories, Akron.

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Buy the Burrs with
CENTRAL HOLES
J. H. SESSIONS & SON
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The CARTER BELL MFG CO
CARTER BELL STANDARD SINCE 1898 RUBBER SUBSTITUTES
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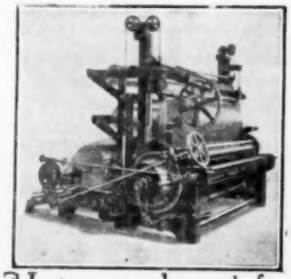
to make stripping is to cut it on Cameron machines.
¶ These are the standard sources of strip supply, whether you make mechanical rubber goods, hose, adhesive tape, brake lining, belting, footwear, friction tape, tissue, insulating tapes, sheeting, duck, tire flaps, tire wrap, or other rubber goods in strips.



CAMACHINE 10 MODEL 20
This is a heavy duty Cameron Machine for universal service in all the branches of the rubber industry. It is built in sizes to handle webs up to 82 inches wide, winding rolls to a maximum diameter of 36 inches. A liner apparatus for insertion and removal of liner fabric is included.

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Carbon Tetrachloride vs. Carbon Bisulphide

Although Doctors Recognize Carbon Tetrachloride as a Toxic Substance, it is Safer than Carbon Bisulphide

By Emery R. Hayhurst, M.D., Ph.D.

IT is stated that potassium cyanide or hydrocyanic acid will kill a chemist but not a florist. This phenomenon appears to be one of the factors to consider in the present discussion.

Recognizing the growing importance in modern industrial practice of the use of poisons in the production of occupational diseases, public control has adopted three methods, viz.: regulation, compensation and prohibition. These methods are stated, I believe, in the order in which they are, and should be adopted. *Regulation* entails the removal from danger to as complete a degree as possible and includes protection of the worker by both his employer and his own intelligence, and the removal of susceptible persons from the hazard. *Compensation* as a means of protection is a round about method and certainly not efficient in practical experience in removing the hazard. Properly speaking our laws do not recognize *prohibition* of the use of industrial poisons; the legislation against yellow phosphorous, for instance, is one of confiscatory tax and not, as commonly supposed, one prohibiting the manufacture of matches made with yellow phosphorus.

Habituation to Poisons

The subject of habituation to poisons and of the establishment of immunity enters also into this discussion. I think we can state a general rule; habituation to poisons of biological origin is both possible and actual as seen in the immunity established to certain diseases by "having" them, or by a gradual exposure to their toxins. These instances, however, have little application to industrial experience. Next comes the question whether immunity can be created to poisons of organic nature, including those in the title of this paper. We may be misled at first when we recall that drug habitués may apparently establish an immunity to extraordinary amounts of morphine, cocaine, etc. Bio-chemists, however, and clinical practitioners know that this is not a true immunity but simply an increased toleration at the expense of reserve capacities in the liver, spleen, etc., and that disaster invariably results. Hence we must not confuse this phenomenon of toleration with immunity or protection. In regard to inorganic poisons there is practically no evidence of immunity or even toleration and in this respect the most dangerous of them, arsenic and phosphorus, are actually among the ones most easily handled physiologically by the body, as illustrated by the fact that each in minute quantities is used as a tonic and a building substance for the tissue cells. In summary, therefore, our philosophy does not countenance the idea of habituation in industry to either organic or inorganic poisons, while at the same time practical experience shows the falsity of toleration, and, in the case of many poisons, the dire effects of accumulative action.

Industrial poisons are poisons because of behaviors in different ways. For instance, some of them act only at the point of contact or absorption, like hydrochloric acid; others act only within the body, as while floating in the blood stream, like carbon monoxide; while others act principally at the places of elimination, such as mercury, carbon-tetrachloride, and others. Again, we have some which may have a poisonous action at all three points, i.e., on entrance, while in the body or tissues, and at the places of elimination, such as benzol, carbon-bisulphide, anilin and others.

The mystery of idiosyncracy or peculiar susceptibility on the part of some persons to some poisons is quite unexplainable. Sometimes we can find that certain physical defects are a basis, such as obstruction in the nose, causing more direct breathing through the mouth and therefore more easy entrance of the poison into the lungs—or short-sightedness, causing the worker to keep his nose and mouth closer to the point of origin of the poison or dust, etc. Again, there is no doubt that many persons fail to take common sense precautions in the presence of poison, in which case we say their personal hygiene is at fault. After all, however, there is always a percentage who are more than usually sensitive to given poisons and, for that matter, to given foods, and, for these, the only present solution seems to be to separate them from the exposure. After this, the scientific method which may permit industry to continue with the use of poisons is to recognize that there is a physiological ability on the part of the average normal person to handle or negotiate each of them to a limited extent, so that it becomes very necessary to know what concentrations can be borne with safety—both immediate safety and permanent safety. It becomes necessary to know, as the physiologist would put it, the "threshold" or the amount of the substance in concentration and time which will just produce the symptoms and signs of poisoning. All amounts less than this can then be recognized as physiologically safe and, as yet, there is no proof that even poisons with accumulative action like lead, carbon-bisulphide, benzol and others will mass up if this threshold amount is not surpassed in each day's exposure. However, this threshold may be surpassed oftentimes, without symptoms and signs of so doing at the time, hence the necessity for knowing, by a chemist's control of the environment, that escaping poisons do not pass the threshold of physiological safety. From this, the definite amounts of most of these poisons which are recognized as having accumulative action have been already determined; for instance, that for lead is authoritatively placed at one milligram per day as swallowed in food or water, or two milligrams per day as inhaled in the form of dust or fumes. Where exposure to lead, therefore, does not exceed these amounts, we may say that the human body negotiates the poison successfully—ingests it, passes it through the blood stream and out of the intestines, liver and kidneys without surmounting the "threshold," so that no evidence of poisoning results.

Certain Solvents Must be Used

In a similar manner our pharmacologists and bio-chemists have established the threshold limits for practically all of the poisons now used in industry. The great problem is to get this information over to industrial managers and to secure the assistance of chemists and engineers in keeping the concentration of these poisons down below the threshold of poisoning. It is true that the threshold has not always been established for a given poison, like carbon-tetrachloride, in the form in which the danger occurs in industry; as I am unable to find definite information stating the threshold limit of breathing the fumes of this substance in small amounts over a long period of time, by man, without the production of symptoms of poisoning, but we may surmise it by understanding the actions of its nearest relatives.

In our Ohio survey of occupational diseases (1913-1915), we stated that the chief poisons employed in the rubber industry arranged in descending order of danger to users, were:

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anilin oil, carbon-bisulphide, benzol, lead and antimony compounds, mineral acids, alkalis, benzine (naptha, petrol, gasoline), wood alcohol, sulphur chloride, carbon-tetrachloride, mercuric sulphide and turpentine. At this time we would put the organic accelerator—hexamethylene tetramine—first, benzol second, lead third, and the balance about in the order given.

Rubber chemists, from what I can learn, insist that they must use carbon-tetrachloride or benzol in some dipping operations and that it is quite impossible to dispense with some of the other solvents, so that they are especially interested in the relative dangers for guiding them into the least objectionable selections. There is also a difference in the question of big scale and small scale operations. From what I have observed small plants still use considerable amounts of the very dangerous carbon-bisulphide, while larger plants, in the same operations, have often stopped its use entirely. Part of this is because of the great fire hazard with the extra insurance risk, but no inconsiderable feature is the danger to health. In Akron, Ohio, the use of carbon-bisulphide is pretty well limited to the smaller plants and even here its use has no doubt decreased in recent years. At the same time its use in the viscose method of artificial silk making is gradually extending, in the country.

Few Cases of Poisoning

I have had a special search made in our State Departmental records for reports of carbon-bisulphide and carbon-tetrachloride poisoning. Ten to twelve years ago we were able to find a dozen cases or so of *carbon-bisulphide* poisoning, but in the last five years there has not been reported a single case of either poisoning among 3,222 cases of occupational diseases reported to the State Department of Health and, in the case of carbon-bisulphide, no instance of a claim for compensation on the records of the Industrial Commission among the 2,844 claims made for occupational diseases between Aug. 4, 1921, and June 30, 1925—a period of nearly four years—likewise, there has been none reported this summer (July and August). In regard to *carbon-tetrachloride*, there has been no report of a case of poisoning from this substance among 5,061 occupational diseases reported to the State Department of Health beginning May, 1913, and ending July 31, 1925. Since this substance is not on the compensation schedule, there is no definite evidence concerning it in the records of the Ohio Industrial Commission, but I am assured by the Chief of the Claims Division, that the substance, carbon-tetrachloride, has probably never come to the attention of that Division for compensation claim. During the last four years, however, of compensation experience, some fifty claims, more or less, for *benzol* poisoning have been filed, while the Health Department has some additional cases in its files.

One of the common substitution products for carbon-bisulphide is the mixture of carbon-tetrachloride and sulphur monochloride. The question arises at once whether this combination may not yield carbon-bisulphide. At my request the laboratory of the Ohio State Department of Health investigated this question, combining varying mounts of the two substances, both in the cold and in heated mixtures, and determined that no carbon-bisulphide was formed. On the other hand, particularly in the heated mixtures, very irritant and indeed suffocative vapors were found to arise, consisting apparently of sulphur dioxide, chlorine and hydrochloric acid, depending upon the amount of moisture and free aeration present—the exact identity of these by-product vapors not being asked for nor determined. Hence, even though carbon-bisulphide does not result from this admixture, irritant vapors arise. Still the natures of these are such that they are self-protective, and workmen would not tolerate them—a result much preferable to exposure to carbon-bisulphide fumes which are, as you well know, easily respirable in dangerous amounts because of delayed and accumulative action.

Carbon-Bisulphide

It is not the purport of my paper to detail the various industrial uses of the compounds mentioned, and I refer the interested person to the usual text-books on industrial chemistry and, from our point of view, books on industrial health and hygiene, for a recitation of such uses. I would point out, however, that the French are said to use carbon-bisulphide on an enormous scale as a remedy against the *phylloxera*, or plant louse, which is so destructive to their vineyards. Also literature shows that its industrial uses abroad have been attended with very much more poisoning than in America, principally because of the exposure of women and girls and youths—at least formerly—and without regard to common sense precautions.

In Ohio where over 75,000 workers were employed in the rubber industry (1920), less than one-half per cent, or a few hundred workers, came in contact with carbon-bisulphide. Dr. Alice Hamilton states ("Industrial Poisons in the United States," p. 364) that in an investigation of 35 American rubber factories employing more than 100,000 persons, she had not found altogether 150 persons engaged in carbon-bisulphide vulcanization. However, in the artificial silk, belt-making, shoe, disinfection and various rubber cementing industries and processes an unknown, but probably considerable total number of persons, is more or less exposed to this poison.

Our book on "Industrial Health" (Kober and Hayhurst) and others in the field, discuss the particular processes in which the substance is used with hazard to health, and the characteristic symptoms. Poisonings from carbon-bisulphide, I find, have entered very little into the literature since 1920 either in this country or abroad. Dr. Richard L. Cameron (New York Industrial Hygiene Bulletin, September, 1925) reports two chronic poisonings which occurred in 1923 at his plant in Buffalo with typical symptoms and slow recovery, but both were able to get back to work eventually in other positions. This spring we had two cases unofficially reported from an artificial silk company in Cleveland which may have been due to chronic carbon-bisulphide or possibly hydrogen sulphide poisoning. The diagnosis in these Cleveland cases was never definitely established while the employing company has now taken extensive measures to reduce any further hazards so that the Cleveland Health Department, which has especially investigated the question, is inclined to believe that no more cases will occur, irrespective of their exact nature. Dr. Hamilton gives an abstract account (*loc. cit.*, pp. 360-369) of the various cases, some fatal, which have been reported in the literature. Complete recovery has been the rule, but Dr. W. Gilman Thompson speaks of the liability to the production of a permanent dementia ("The Occupational Disease," p. 319).

Various Impurities Often Found

It is interesting to note that certain impurities in carbon-bisulphide may occur, such as sulphur dioxide, sulphur and hydrogen sulphide, making it worth while from a health viewpoint to utilize the ordinary tests for these impurities in its commercial handling (see the United States Dispensatory for easy tests for impurities). As an impurity, CS_2 also occurs in many of the other solvents. The Germans state that commercial benzol, with them, may contain from 16 to 60 per cent of CS_2 (Hamilton, p. 454).

I mentioned previously that some ten or twelve years ago a number of cases of carbon-bisulphide were brought to the attention of the State Department of Health and its investigators during a survey of occupational diseases which was being made in the state at that time (reported Feb. 1, 1915). These complained of feeling "drunk," whereupon fellow workers would take them into the open air (with little concern). Usually new men were the ones most afflicted. Two instances with paralytic attacks came to our notice at that time which may have been due to carbon-bisulphide poisoning. We have not intensively investigated the subject since, but, as I have stated, no instances of poisoning have ever been officially reported.

The symptoms of the usual industrial cases of carbon-bisulphide poisoning are described by Dr. Cameron (*loc. cit.*) which I abstract, briefly, as follows:

> Case X presented himself at the first-aid room complaining of loss of appetite, loss of weight, dizziness, mental depression, hallucinations and irritableness. This

man was an artificial silk worker and had been exposed to carbon-bisulphide for a trifle over three months (Jan. 5, 1923, to April 10, 1923). In talking with this man he became highly excitable, lost self-control entirely, kept crying and saying that he had pains in his temporal regions and the nape of his neck and that he could not walk with certainty. He was 25 years old, fairly well developed and nourished, showed slight tremor of the tongue, swaying when his eyes were closed (Rhomberg sign) and all of his reflexes were exaggerated. The urine showed the least possible trace of albumin. There was no anemia but rather an increase in hemoglobin and, after a ten days' stay in the hospital, his symptoms began to clear up after which he made an uneventful recovery and is at present employed at other work.

Case Y presented himself at the dispensary complaining of weakness in his legs and arms, with loss of weight and general depression, also that he would become irritable at home following his work-day period. He was 40 years of age, slender in build but wiry. He had been exposed to carbon-bisulphide for ten months during no part of which time had he presented himself at the first-aid room for treatment of any kind. He was taken off his job, sent home, kept under observation with symptomic treatment until his mental state improved, when he was sent to the hydrotherapy department for massage and stimulation of his affected parts. Blood and urine were negative except for an increase in the hemoglobin content. He is now working in another department.

Concentration Necessary for Poisoning

The amount of carbon-bisulphide vapors which will produce poisoning through inhalation is given in the tentative report by your Industrial Poisons Committee, (Thirteenth Safety Congress Proceedings, p. 243) as 0.1 per cent, which figure is evidently taken from Dr. Thompson's book on "Occupational Diseases" (p. 316) where it is stated that a proportion of 0.5 to 1.0 of CS_2 to 1,000 of air is toxic. This permissible amount, or let us say "threshold limit," strikes me as exceedingly high, for I have been used to placing the figure at a very few parts per million. I find that Lehmann (Kober and Hayhurst, "Industrial Health," p. 361), in 1897 and 1908, placed the figure at 1 part per million, which would produce mild symptoms, while 1½ parts would produce severe symptoms. He states that as much as 2 to 3 parts per million have been found in work places. Dr. Alice Hamilton (*los. cit.*, p. 361) gives Lehmann's figures, as reported in 1894, with greater detail, but of the same magnitude. Personally, therefore, I have grave doubts that your committee's figures of 1/10 per cent or one part in 1,000, or 1,000 parts per million, where Lehmann talks of one part per million, should be accepted as safe, at least until further investigation on the subject is made. Fieldner, Katz and Kinney (Tech. Paper, 248, U. S. Bur. of Mines, 1921), show a chart made up from the literature, which gives the parts per million reported to be poisonous for CS_2, CCl_4, benzol and many others, but they have taken Thompson's figures for CS_2 for man.

The present tendency is to substitute carbon-bisulphide with carbon-tetrachloride and other substances in the rubber industry and such is freely discussed in the industrial health text-books on the subject (Alice Hamilton, p. 530; Kober and Hayhurst, pp. 366, 542; W. Gilman Thompson, p. 319). The "Bibliography on Benzol" prepared by your Benzol Committee (Twelfth Safety Congress Proceedings, pp. 213-219) contains numerous references to other poisonous solvents. Another excellent exposition on this subject of carbon-bisulphide poisoning is to be found in Special Bulletin No. 76 of the New York State Department of Labor, published in 1916, which also gives the British factory and workshop orders and regulations concerning its safe handling.

Carbon-tetrachloride has also a wide use in industry as a solvent for rubber, gums, fats, etc. It has the great advantage of being non-inflammable, but the disadvantage of being rather expensive. According to the paper by A. G. Smith, read before the Twelfth Safety Congress (Proceedings, p. 232), the mixture of 65 per cent carbon-tetrachloride with 35 per cent gasoline is doubtfully subject to static sparks, is very slightly inflammable and appears to make a happy combination all round. In fact, carbon-tetrachloride has been recommended as a substitute for petroleum benzine by Rambousek (Kober and Hayhurst, pp. 506, 542) — dichlorethane having a like use. Rambousek regards it as less toxic than petroleum benzine, while it has been the natural substitute for carbon-bisulphide for years. In spite of its expense, it is extensively used in Ohio in place of the bisulphide. The old "acid" or "cold" cure in rubber districts in this vicinity has been largely replaced by the various substitute solvents and vehicles, and there is no doubt that the use of carbon-bisulphide as a vulcanizing agent could be practically dispensed with (Kober and Hayhurst, p. 366).

As is well known, carbon-tetrachloride, under the name of "Carbona," is used as a cleaning agent for grease spots in clothing, etc., and, under the name of "Pyrene," is widely used as a fire extinguisher. In this latter connection Fieldner and others (Kober and Hayhurst, p. 388; Alice Hamilton, p. 442) have pointed to the great danger of using it on fires in close quarters where dangerous amounts of carbon monoxide gas, phosgene, carbon dioxide, carbon-tetrachloride and hydrochloric acid may be developed, with dire results to any who may inhale the same. I wish to call attention to an additional use of carbon-tetrachloride which is becoming more and more extensive, although barely mentioned in our industrial hygiene books (Kober and Hayhurst, p. 157). About two years ago Dr. M. C. Hall introduced its use for the clearing out of hook-worms and other parasites from the bowel tract of human beings. In this therapeutic-capacity it replaces thymol. There have been a number of fatalities reported from its use in this capacity, but these have not seemed to deter the application; for instance, Cristobal Manalang of the Philippine Health Service (Bulletin Vol. V., No. 2, February, 1925, pp. 49-55) states that 26,000 persons have been given treatment to date by the service in the Philippines, the dose being 1 c. c. for every 5½ kg. of weight, therefore amounting to approximately 12 c. c. for a 150 lb. man—with occasional symptoms of dizziness and vomiting. Bowel movements begin in about one-half hour. One dose only is customarily administered, usually early in the morning. Subsequent treatments are given at four to five day intervals, where examinations of the stools show that parasites have not been completely removed by previous administration. Dr. Manalang fails to say anything about instances of fatal consequences. However, he appears to be a strong advocate of the method for clearing up hook-worms and other intestinal parasites in the Phillipinos.

Forming Rubber Gloves on the Hand

You may be interested to know that aseptic surgeon's gloves may be formed directly on the hands by a solution of 4 per cent caoutchouc or India rubber with 0.4 per cent iodine, in full strength carbon-tetrachloride. This gives a coating to the hands of the surgeon which is both sterile and impermeable. The vapors of carbon-tetrachloride are also used in medicine for inflammation of the eyes (conjunctivitis), ulceration of the cornea (or surface of the eye), photophobia (or unwillingness, usually because of pain or discomfort, to face the light), as well as gastralgia (or stomach ache). It has also been used for dry shampoos since 1907 (London Lancet, June 22, 1907), but it has also been followed by fatal consequences as a hair wash or shampoo, the first case being reported by Dr. Willcox in London in 1909 which occurred in a woman, (Alice Hamilton, 441; Kober and Hayhurst, p. 576). It has also been used for cleaning skin around wounds. (MacAuliffe, Bull. Acad. de Med. Paris, 76, p. 180, Sept. 5, 1916), and as a delousing agent (M. H. Foster, Pub. Hlth. Reports, Vol. 33, p. 1823, Oct. 25, 1918).

Certain impurities in carbon-tetrachloride may have a health angle. These are chlorine, carbon-bisulphide, and non-volatile matter. Therefore, as with carbon-bisulphide, users should know whether or not they are dealing with the purified product.

In the manufacture of carbon-tetrachloride dangers exist from chlorine, carbon-bisulphide, antimony chloride, and methyl chloride (Kober and Hayhurst, p. 631).

It is my purpose in giving all of these various uses of carbon-tetrachloride to show that it is not an overly dangerous poison even when ingested in fairly large amounts; also to show that the inhalation of its fumes alone have produced fatal consequences in short order in apparently harmless operations such as shampooing the hair of the woman where, with the tresses hanging down, enough was apparently inhaled to result in sudden death.

Note Its Resemblance to Chloroform

The point before us is whether carbon-tetrachloride as used in industry is dangerous. First, we note its resemblance to chloroform; CCl_4 *vs.* $CHCl_3$. At once we find the toxicity of carbon-tetrachloride in relation to that of chloroform is disputed. British experimenters claim that it is twice as toxic as chloroform while the Germans maintain that it is only one-half as toxic (Peterson, Haines, and Webster, "Legal Medicine," 2nd ed., 1923, Vol. II, p. 794; Alice Hamilton, p. 441; Kober and Hayhurst, pp. 542, 576). In the discussion before this body (Proceedings, 12th Safety Congress, pp. 222-23) regarding the use of CCl_4 in place of benzol as in cementing rubber shoe soles, Mr. Horan appeared to favor it, but Dr. Sawyer said that he had had some rather drastic experiences with it where it was not possible to secure good ventilation, so much so that as a solvent it had to be changed, while C. E. Rice of the Dow Chemical Co., Midland, Mich., where it is manufactured, supported Dr. Sawyer's contentions and issued a warning regarding it. Lehmann, according to Hamilton (p. 442), in 1911, found that rabbits developed chronic poisoning and usually died on the third or fourth day from bronchitis and bronchial pneumonia after an (inhalation) exposure of 8 hr. to 8 to 10 mg. The odor is very strong when the air contains more than 3 to 5 mg. in a liter.

As much as 5 to 10 mg. may be breathed for 6½ to 8 hr. with no more serious effect than dullness, torpor, and sleepiness. With 20 mg. animals show increased drowsiness and headache; with 40 mg., narcosis, preceded by sneezing, itching of the eyelids, salivation, loss of equilibrium and muscle twitching; with 60 mg., helplessness, but not complete loss of consciousness for several hours. It requires 80 mg. to get deep narcosis and 240 mg. to cause death at the end of 2 hr. In 1912, Lehmann reported (see Fieldner, Katz and Kinney, *loc cit.*), that 4,000 to 6,300 parts per million was the maximum amount for one hour's inhalation without serious symptoms, while Allison and Katch (*loc. cit.*) found its least detectable odor was 718 p.p.m. Frois in 1922, states that 15 mg. per liter induces narcosis, headache and vomiting in man.

Being an excellent fat and lipoid solvent, it undoubtedly is easily absorbed through the skin and, like other similar volatile solvents, may poison workers whose hands or skin are wet with it.

Physiological Effects

Its toxic action is further brought out by Evarts Graham, who in 1915 (Jour. Exper. Med., Vol. XXII, p. 48) reports that it has a more marked effect on the liver than chloroform due to its greater content of the HCl group. He also thinks that, whereas four molecules of HCl can be obtained from CCl_4, only 3 from $CHCl_3$ and only 2 from CH_2Cl_2, the minimum fatal dose is smallest for CCl_4, next for $CHCl_3$, and largest for CH_2Cl_2. Alice Hamilton (p. 442) points out that poisoning by carbon-tetrachloride under certain conditions is usually poisoning by carbon oxy-chloride, or phosgene gas, similar to Fieldner and Katz's findings with the use of Pyrene fire extinguishers in close quarters. Dr. Hamilton (p. 532) states that the Germans consider work done with mixtures of carbon-tetrachloride dangerous enough to require that it be done under a glass cabinet furnished with an air exhaust.

As to the chronic effects of carbon-tetrachloride in rubber works, Alice Hamilton (p. 444) states that poisoning sometimes occurs though she never found a case of very severe poisoning. Nausea, loss of appetite, loss of weight, irritation of the eyes, nose and throat, and inflammation of the skin of the hands and forearms were the symptoms complained of. Von Jaksch quotes Erben (Hamilton, p. 444) to the effect that there are severe nervous disturbances. My former colleague, Dr. E. B. Starr, considered that the burning sensations in the throat and eyes, occurring in millinery workers using a mixture of approximately two-thirds carbon-tetrachloride and one-third benzol as a solvent for a rubber cement, were signs pointing more to carbon-tetrachloride than to benzol effects. He quotes Lehmann to the effect that 3,980 parts per million of air, about 0.4 per cent, may be inhaled for about an hour without serious consequences. Practically, however, Starr says it is very difficult to tell what part poisoning by carbon-tetrachloride takes in its various mixtures with other solvents and vehicles used for rubber, cements, vulcanizing, etc. (Jour. Ind. Hyg., Vol. V, p. 203, Sept. 1922).

Phelps and Hu (Jour. A.M.A., Vol. 82, p. 1254, April 19, 1924) describe the symptoms and autopsies of two fatal cases of carbon-tetrachloride poisoning and a series of animal experiments with the substance when administered per mouth. The outstanding symptoms are also given by Petersen, Haines, and Websters (*loc. cit.*, p. 652). It has a narcotic action similar to that of chloroform but in addition causes convulsions and is said to be more injurious to the heart. Levassort (J.A.M.A., Vol. 60, 1913, p. 1719) had a shampoo case which recovered, but with long continued hebetude, or stupidity, but the substance on analysis was found to contain some carbon-bisulphide. A writer in the British Med. Jour. (A.D.H., Vol. II, 1920, p. 497), reports anemia and jaundice as among its manifestations.

Post-Mortem Examinations Explain Symptoms

Post mortem examinations easily explain the symptoms referred to. According to Phelps and Hu two cases which were given carbon-tetrachloride for hook-worm treatment, one a negro child aged 5½ years, and the other a man aged 46 years, developed toxic symptoms within 2 days, the child dying in 4 days and the man, in 40 hours. Extensive fatty degeneration and necrosis of the liver and suprarenal glands, and hemorraghic areas with ulcers in the small intestines were found. These findings are about the same as those occurring in chloroform poisoning. These authors believe that where death does not occur, regeneration of liver cells takes place very rapidly, within 8 days, so that a late autopsy might fail to reveal the characteristic liver pathology, which fact has very likely mislead others to wrong conclusions.

I think, therefore, we are safe in assuming a close analogy to chloroform poisoning such as that of delayed type, which may come on between 10 hours and 4 days after giving a chloroform anaesthetic. The symptoms also resemble phosphorus poisoning,—with jaundice, very acute gastritis, pulmonary edema, and heart failure. Chronic poisoning by chloroform takes place in drug habitues and others who take it in whiffs for relief of pain. These suffer from digestive and nervous symptoms and finally get into a condition which cannot be distinguished from delirium tremens. Autopsies on such persons show, in earlier cases, redness of the throat and stomach, sometimes with ulceration; and, in later cases, jaundice with fatty degeneration of the heart, liver, spleen, kidneys, and other vital organs. Apparently less amounts of chloroform than carbon-tetrachloride may produce poisoning when administered per mouth, but there is great individual variation.

In view of all the evidence, therefore, let us handle carbon-tetrachloride with all due precaution. I believe that practically the same precautions should be taken as though persons were working with benzol, chloroform or carbon-bisulphide. In other words, those with ill health, those who are ill-nourished, those with anema (hemoglobin under 80 per cent) women, boys and girls, diabetics, and those with liver disorders, or showing acetone in the urine, should be precluded from exposure.

I am inclined to agree with Chas. F. Horan who, in a communication to J. M. Sandel of the National Safety Council, Rubber Section, in January of this year, stated that the recommendations of the Benzol Committee (First Progress Report) with regard to ventilation of working premises are applicable to carbon-tetrachloride but that carbon-tetrachloride is prefereable to any other rubber solvent used. These benzol

(*Concluded on Page* 102)

Modern Compounding Ingredients

Properties and Use of a Number of Well-Known Rubber Accelerators, Softeners and Pigments

*By John M. Ball**

PART I

"Tuads" and Super-Sulphur No. 2

Recently the R. T. Vanderbilt Co. made arrangements to market its rubber compounding materials in Europe. Dr. A. A. Somerville made a trip through various European countries to arrange for representation there. The representatives selected employ a staff of technically trained men and their first request was for technical information pertaining to the properties of the Vanderbilt materials used in rubber compounding. Accordingly, John M. Ball wrote a series of rather lengthy letters to the agents, setting forth the information of general interest pertaining to these materials. As it is thought that this same matter would be of interest to rubber manufacturers here, these letters will be reproduced in abbreviated form. In our next issue three additional materials will be discussed.
(The Editor)

(A) "TUADS" (Tetra-Methyl-Thiuram-Disulphide)

"TUADS" is the oxidized condensation product of dimethylamine and carbon disulphide. Despite its high cost per pound, owing to the small amounts of it required in the compounding of rubber, its actual cost in the compound is not only not excessive, but in many cases is really below that of accelerators having a much lower initial pound cost. It is, of course, the cost per unit of accelerating power which is important, and not the cost per unit of weight of the accelerator.

"Tuads" is a thoroughly practical ultra-accelerator. All ultra-accelerators give about equal rates of vulcanization at ordinary curing temperatures or even at 260° F. (127° C.), but each one has its own specific temperature of activity for a given time of cure; and it is this temperature of activity which is important in discussing the workability of these accelerators rather than their rate of cure. The zinc salt of di-methyl-di-thio-carbamic acid is also an ultra-accelerator, but its temperature of activity is a little too low for convenient factory handling. "Tuads" on the other hand, has a temperature of activity high enough so that it is workable in the factory and is not set off at the temperatures attained by the mixing mills and calenders.

All this does not mean that "Tuads" is what might be termed "fool-proof." No accelerator as active as "Tuads" can be handled carelessly and indeed there are several organic accelerators a good deal less active than "Tuads" that have been known to scorch occasionally during mixing and calendering. If, however, the usual principles of handling fast-curing stocks are observed, "Tuads" can be handled readily.

These simple principles of good mixing and factory handling are as follows:

1. The "Tuads" should be used in the form of a master batch, not exceeding about 10% of the batch. This will eliminate all the difficulties of weighing out very small amounts of accelerator and will also give perfect distribution which is not always achieved when an accelerator is mixed in the free state.
2. This master batch should be added first to the crude rubber and reclaimed rubber before the pigments, and the sulphur should be weighed out separately and added as the very last thing after everything else is mixed. Thus the chances for burning are reduced to a minimum and the sulphur mixes in easily and quickly.
3. The mill rolls should not be too far apart during the mixing, but reasonably close together so that the gage of the stock being mixed is not excessive. The mixing temperature of a fairly thin stock is more easily controlled than that of a thick one and such a stock does not develop so much heat as does a thick one.
4. Slabs should be cut from the rolls fairly thin (not greatly in excess of ¼ of an inch—0.6 cm.) so that they may cool as rapidly as possible.
5. These slabs should under no condition be piled one upon the other until after they have thoroughly cooled *all the way through.*
6. Scrap from the calender should have as careful attention as the original mix in these last two respects.
7. Mixed, uncured stocks should not be allowed to lie around in the factory unused for many months. It is not that the stock will cure up in the storage bins ("Tuads" stocks will not cure on standing if they have been properly mixed), but simply where so much depends upon a small amount of accelerator it is best to use fairly fresh stocks. With a colloidal material like rubber there are always various solubility and adsorption phenomena taking place slowly that bring about a gradual change in the mass.

Thiuram-Disulphide is active at twenty pounds of steam as well as at forty pounds and is also active at as low a steam pressure as ten pounds. Below are given the test figures of curves at four different temperatures of the following compound:

Rubber	100
Zinc Oxide	5
Sulphur	4
"Tuads"	0.20

TEMP.	5 Minutes Tensile	5 Minutes % Elong.	10 Minutes Tensile	10 Minutes % Elong.	15 Minutes Tensile	15 Minutes % Elong.	30 Minutes Tensile	30 Minutes % Elong.	45 Minutes Tensile	45 Minutes % Elong.
10 lbs.										
239° F.					4050	865	4720	710	4350	705
115° C.					(285)		(332)		(306)	
20 lbs.										
258° F.			3700	870	4920	795	4820	765		
125° C.			(260)		(346)		(339)			
40 lbs.										
287° F.	3460	750			4450	750	4020	770		
141° C.	(243)				(313)		(283)			
60 lbs.										
307° F.	3800	790	3740	795	3680	775				
153° C.	(267)		(263)		(259)					

Note:—The figures for tensile not in parantheses are given in pounds per square inch; those in parantheses are in kilograms per square centimeter.

These results are interesting from four standpoints:

1. The extremely quick cures.
2. The high test figures.
3. The low temperature activity.
4. The maintenance of super-quality over a big range of temperatures.

Sometimes a manufacturer wants an accelerator with a big

*R. T. Vanderbilt Co., New York.

curing range, or in other words one that will not overcure readily. The above figures show "Tuads" to have the biggest curing range of any accelerator with which we are familiar.

There is no doubt that low temperature vulcanization, that is, at 260° F. (127° C.) or less gives better rubber than high temperature vulcanization. Two opposing actions are taking place during vulcanization; one, the softening and consequent degradation of rubber due to heat, and the other the stiffening and stabilizing of the rubber due to the chemical addition of sulphur. If, now we can get the chemical addition of sulphur without the undersirable heat effect we are bound to get a superior product, and this is just what happens when we cure with "Tuads" at low temperatures. Furthermore, aging with "Tuads" is unusually good, especially of low temperature cures, and this is generally recognized.

Tuads" is effective in all kinds of cures—steam, hot air, or mold. It is not retarded by whiting, barytes, Thermatomic Carbon, Mineral Rubber, or by most softeners. In fact, surprisingly high amounts of Mineral Rubber may be added to rubber if the cure is at low temperatures as seen for example by the tests on the following compound containing 25% of Mineral Rubber on the rubber.

Pale Crepe	100
Zinc Oxide	3
Sulphur	4
"Tuads"	3/16
Mineral Rubber	25
"Thermatomic Carbon"	10

——15 Min. @ 20 lbs.——			——30 Min. @ 20 lbs.——			——45 Min. @ 20 lbs.——		
Load @ 500%	Tensile @ Break	% Elong. @ Break	Load @ 500%	Tensile @ Break	% Elong. @ Break	Load @ 500%	Tensile @ Break	% Elong. @ Break
650	3220	795	810	3720	770	910	3770	765

"Tuads" is however retarded by clay, carbon black, and reclaim, so that in general when these materials are present it is desirable to use some other accelerator along with the "Tuads" such as di-phenyl-guanidine, or di-o-tolyl-guanidine as shown in the following formulas. This combination overcomes the retardation perfectly.

	A-1	A-2	A-3
Rubber	100	95	90
Tire Reclaim	—	10	20
Zinc Oxide	10	10	10
Sulphur	3	3	3
Carbon Black	30	30	30
"Dixie" Clay	20	20	20
"Thermatomic Carbon"	10	10	10
Di-phenyl-guanidine	1/2	1/2	1/2
"Tuads"	3/16	3/16	3/16
Pine Tar	1	1	1

	——30 Min. @ 20 lbs.——			——45 Min. @ 20 lbs.——			——60 Min. @ 20 lbs.——		
	Load @ 300%	Tensile @ Break	% Elong. @ Break	Load @ 300%	Tensile @ Break	% Elong. @ Break	Load @ 300%	Tensile @ Break	% Elong. @ Break
A-1	1050	3480	600	1130	3700	605	1190	3640	590
A-2	1000	3480	600	1170	3680	590	1190	3340	575
A-3	1000	3260	625	1130	3400	600	1240	3400	585

Magnesia in any form should not be used with "Tuads," and we have not yet been able to make "Tuads" cure antimony properly except when high amounts of "Tuads" are used. Furthermore, so far as we know now "Tuads" positively cannot be used with white substitute for the reason that this material kills the accelerator. With brown substitute the cure is good.

The chief uses for "Tuads" are as follows:

Pneumatic tires. "Tuads" should be used alone in the carcass stocks, but in conjunction with another accelerator in the tread. If it is not desired to use as low temperatures as are shown with the suggested formulas, higher temperatures may be used providing the amount of "Tuads" or the time of cure be lessened if necessary.

High Test Belt Frictions. It is impossible, we believe, to get higher test belt frictions than can be obtained with "Tuads"; 0.15% of "Tuads" on the rubber will give excellent tests with 3% or 4% of sulphur and the tests increase in quality as the "Tuads" is increased up to about 0.25%. Cures should preferably not be made at a temperature higher than 260° F, or 275° F.

Dry heat specialties such as corset stocks. "Tuads" gives the best corset stocks it has been possible to make for the reason that the low temperature cure does not destroy the delicate fabrics laid on to the rubber, the compound is very snappy and resilient, and the finest shades and tints are possible, inasmuch as "Tuads" is neutral to colors. Fairly high "Tuads" is used here, about 0.375% on the rubber, together with about 2.75% sulphur, and a little zinc oxide and Lithopone besides the organic color. The cure is about forty-five minutes at 240° F. (116° C.) after the temperature has been raised to that point.

Footwear. Footwear cured with "Tuads" quickly at 240° F. is far superior to the old line of goods cured with Litharge at high temperatures in a long heat, and is less expensive to make. Instead of the old five to nine hour cure, light footwear of the highest grade is being turned out in less than two hours including the rise. Almost everyone who experiments with "Tuads" in footwear overcures his compounds at first, and as they are often a bit soft in the overcured condition due to reversion or oxidation the natural supposition is that they are *uncured.* It is ordinarily not necessary to use any other accelerator along with "Tuads" in footwear unless the amount of reclaim is unusually high. Any reclaim used must be absolutely free from lead in any form, as lead poisons the action of "Tuads" at these low temperatures. We have seen heavy boot soles cured with "Tuads" that have far outworn already high grade boots in severe service in mines.

Crepe Soling. At first crepe soles were finished uncured, but now for light canvas shoes they are largely being cured with the entire shoe. "Tuads" will cure these soles to the desired degree of snap and color. If the old, long shoe cures are maintained and the attempt is made to use "Tuads" in the sole alone the result will surely be an overcure in the sole, and unsatisfactory results. The better way is to make a special cure and special stocks for the entire shoe.

Clothing. Here "Tuads" may be used in percentages (expressed on the rubber) identical with those used in footwear. The cures will also be the same after the temperature has reached 240° F., which is the best temperature for curing. The compound suggested for a boot upper will make a medium grade clothing compound, and the quality will vary up and down on either side of that compound as the crude rubber content is raised or lowered. Spread goods properly cured at 240° F. with "Tuads" are better initially and last longer than any other kind.

Bath Caps. "Tuads" easily allows one to get the bright colors so much desired in these goods, in addition to a quick cure.

Hot Water Bottles. Better bottles are made with "Tuads" at relatively low temperatures at the same cost as the old. They resist the action of heat unusually well.

Toy Balls. White, colored and cheaper balls of high quality are made with "Tuads."

(B) "Super-Sulphur No. 2"

This is an ultra-accelerator somewhat similar chemically to "Tuads," being the lead salt of di-methyl-di-thio-carbamic acid built up on a clay base. The actual active principle, namely the lead salt itself, is as powerful an accelerator as "Tuads." It is not however active at such a low temperature, so that for dry heat it is necessary to go as high as 260° F. (127° C.), and for press cures as high as 274° F. (134° C.). Still higher temperatures also give excellent results, and this accelerator withstands these higher temperatures better than does "Tuads." For this reason "Super-Sulphur No. 2" is easier to handle in the factory than "Tuads" and in fact is one of the safest organic accelerators.

Whereas "Tuads" requires zinc oxide as an activator it is important to remember that "Super-Sulphur No. 2" requires *litharge* as an activator, which fact limits its use of course to dark and tan colored goods. This property of "Super-Sulphur No. 2" in being activated by litharge is unique in organic accelerators and makes it splendidly adapted to a wide range of mechanical goods in which litharge is, we believe, generally used. It can in fact be used in any article in which there is no objection to the use of litharge. "Super-Sulphur No. 2" is also activated to some extent by zinc oxide,

but to a less degree than by litharge. It is therefore recommended that both zinc and litharge be present in the compound. Where reclaim is used the zinc is not so necessary inasmuch as reclaim generally contains some zinc.

The use of "Super-Sulphur No. 2" enables a compounder to cut down on the amount of his litharge with a consequent substantial saving. In addition the amount of sulphur will usually have to be lowered and the time of cure will in almost all cases be considerably shortened, and in many cases the temperature of cure may be dropped, though not to as great an extent as with "Tuads." In general, from 3 to 5% of "Super-Sulphur No. 2" on the rubber together with about twice this amount of litharge is recommended.

The principal uses of "Super-Sulphur No. 2" are as follows:

General Mechanical or industrial goods. As just mentioned most of these already contain litharge and it is a simple matter to add a little "Super-Sulphur No. 2," and perhaps take out a little litharge and sulphur, with a resulting quicker cure and lower cost. In such items as heels, hose, mats, valves, and packing "Super-Sulphur No. 2" will be found invaluable.

High Test Belt Frictions. "Super-Sulphur No. 2" gives splendid results here with litharge and is easy to handle in the factory. Not only are the original friction tests unusually high, but they will remain so over a period of several years. There is another good feature about "Super-Sulphur No. 2" and that is if some Pine Tar is used along with it and litharge it will cure up poor grades of crude rubber perfectly and make them almost as good as first quality grades. This is because the Pine Tar contains the essential organic acids which are lacking in the poor grades of rubber, and the "Super-Sulphur No. 2" reinforces the beneficial effect of these acids to a marked degree.

Conveyor Belt Covers. Splendid quality is obtained here with "Super-Sulphur No. 2."

Footwear. Inasmuch as many footwear stocks contain very high litharge, which is the activator for "Super-Sulphur No. 2," its use will give, (a) a compound of lower cost due to the lower litharge necessary; (b) articles lighter in weight for the same reason; (c) stronger and better stocks; (d) a shorter cure if desired.

The proper temperature for curing footwear with "Super-Sulphur No. 2" is 260° F. Of course, the use of "Super-Sulphur No. 2" is limited to black and tan colors, whereas "Tuads" may be used in stocks of any color. It has been found that the use of "Tuads" in footwear is a step in advance of the use of "Super-Sulphur No. 2," but some manufacturers prefer to hold to litharge where they can use it.

Spread Goods. "Super-Sulphur No. 2" is recommended here if litharge is already present. The cure should be the same as for footwear after the rise.

Pneumatic Tire Treads and Carcass Stocks. If there is no objection to the use of litharge in tires, excellent results and short cures are obtained with "Super-Sulphur No. 2." An over-all cure of one hour including the rise is easily possible for small tires.

Tire Beads. Whether or not "Super-Sulphur No. 2" is used in treads and carcasses it may be used to good advantage in beads to give a quick semi-cure and is suggested for this purpose.

Insulated Wire. Since litharge is the old standby for the curing of insulated wire there is a good opportunity here for use of "Super-Sulphur No. 2" to get the highest possible quality. Of course it is not possible to improve greatly the quality of a compound already as cheap as that used for code wire; but nevertheless there is an opportunity here. Furthermore, in 30% insulation (by which is meant a minimum requirement of 30% of rubber in the compound as distinguished from a minimum requirement of 20% for code wire) the argument for the use of "Super-Sulphur No. 2" on the basis of quality and short cure is even better than in the case of code wire.

Mr. Ball will discuss "Hard Hydrocarbon" Mineral Rubber, "Thermatomic" Carbon and "Dixie" Clay in the next issue.
(EDITOR)

REVIEW DESK

DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA. Edited by A. L. Dyke. 14th Edition. 1,249 pp. 4,200 Illustrations. Indexed. The Goodheart-Wilcox Co., 2009 South Michigan Ave., Chicago, Ill. Cloth $6.00. Flexible Binding $7.50.

The most noticeable additions to the new addition of this comprehensive volume are several colored charts. In the section where troubles are treated, a sixteen-page form has been added with four large colored trouble-shooting charts, one being that of a complete ignition system. Other colored charts show a complete fuel-feed and carburetion system, a generator and its circuits, and the starting motor and its circuits.

A. L. Dyke, editor of the encyclopedia, who is a pioneer in the automobile field, has changed 512 pages of this, the first edition of the world-famous book since 1922. And 221 illustrations have either been changed or new ones substituted. The index has been enlarged and about 1,200 lines added, making over 15,000 lines.

The entire scheme of the book is such that it makes the most technical subjects appear simple and easily mastered. The book does not contain a lot of mathematics or engineering formulas. Far from it. The reader is unconsciously led from simple principles to the more complicated processes. As he advances, he has the groundwork to enable him to understand. Nothing is discussed that is not first explained. The book is like the automobile itself. As a complete machine, it is a complicated product. But to the one who has learned how to build it, part by part, it is a simple affair. So with the book itself. To him who reads it painstakingly and carefully from the very beginning, each subject is made so plain that he is unconsciously ready for the next.

Moreover, this method makes each subject interesting. As the reader progresses from page to page, he is eager to learn more and more. Here is where the book accomplishes its greatest mission; it shows how to go about learning any subject connected with the automobile. It starts with fundamental principles; it works up as it goes along; it teaches the reader to think and to reason, and to use the brain more and the tools less.

The book is specially unique in this particular. Many thousands have learned from it to use their mind and their own brains. They have told others about it, about its usefulness and its helpfulness—and in this way the book has earned its reputation. The sale of this book is now enormous—principally due to the advertising it has received from its friends and satisfied readers.

It has been the purpose of Mr. Dyke, in compiling this book, to divide the car into component parts, giving diagrams of each, just as physiology would divide man's anatomy into bone, muscle, blood, and nerve systems. This book not only teaches the fundamental principles of each and every unit of a car, but it is a course of mental training, so that when a difficulty does arise and the user is called upon to "think for himself," his thoughts will take the shortest and most direct cut to the thing that needs to be done.

This book is the outgrowth of the first practical automobile trouble and remedy book published in America, which also was written by A. L. Dyke.

During the War the book was used extensively by institutions all over the United States in training motor mechanics for government service, and it was sanctioned for use in the Schools of Military Aeronautics in England.

"Dyke's Automobile and Gasoline Engine Encyclopedia" is of benefit to the car owner, the chauffer, the student, the beginner or apprentice, the instructor in schools, the repairman, to service station manager and garage owner, the automotive electrician, the storage battery repairman, the trouble shooter, the automobile salesman, and in fact to everybody interested in automobiles. Nowadays that includes almost everyone.

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THE MARKET PLACE Section Continued on Second Page Following.

MARKETS

Cottons and Fabrics

NEW YORK, Nov. 2, 1925

The outstanding features of the past two weeks was the publication on the 26th of the Government mid-October crop report on the indicated yield, the quantity of cotton ginned to Oct. 18 and the estimated abandonment of acreage since June 25. The indicated yield of 15,226,000 bales, although considerably above average expectations, was generally accepted as being correct. The ginning figures of 9,519,784 bales, despite the fact that they were 1,760,000 bales more than the previous record for the period, represented a smaller percentage of the probable production than had been anticipated. However, no importance was attached to this fact as it was realized that owing to the inclement weather in many parts of the belt, picking had been delayed. Of the 46,448,000 acres of cotton standing on June 25, about 2,217,000 acres were estimated to have been abandoned, an area somewhat smaller than that expected.

Although some authorities are skeptical regarding the yield indication figures, the possibility is recognized that under favorable weather conditions during the remainder of the season these figures may easily be exceeded. The large volume of liquidation and southern selling which followed the publication of the Government report was absorbed by trade and outside interests who, although previously of the opinion that prices were too high, became convinced that the downward adjustment had gone far enough. It was felt that despite the promise of a crop in excess of 15,000,000 bales without Inters, purchases of contracts for future delivery of cotton below the twenty cent level might be made with comparative safety until a more definite idea of the season's yield could be obtained. In addition, speculative buying was influenced by the belief that considering the drastic decline of $25 a bale which has occurred since Sept. 17, a sharp rally was to be anticipated.

The action of the market in the face of repeated reports and predictions of killing frosts and of the rapidity with which cotton is moving out of sight has been disappointing to brokers. A. Norden & Co., one of the largest, is inclined to think that the failure of the market to respond to constructive factors must be attributed to the impaired technical position.

New York Prices

	Open	High	Low	Close	Close Oct. 15
December	19.00	19.49	18.97	19.39	21.38
January	18.30	18.85	18.29	18.78	20.68
March	18.64	19.10	18.58	19.04	20.95
May	18.73	19.24	18.72	19.16	21.16
July	18.35	18.84	18.32	18.74	....

TIRE FABRICS

During the past two weeks the surplus stocks of carded peeler square woven have been largely depleted. Orders have been small or not in excess of a total of 250,000 pounds. There is a considerable potential need of further supplies, although tire manufacturers are said to be covered at the present time. There are a number of conditions which indicate a better outlook for tire fabric. The large increase in the use of balloon tires is one. As tire producers are not requesting deferment of fabric shipments the tire fabric situation is considered normal for this time of year. This fact is considered important as the elimination of spring dating had led to the expectation of considerable manufacturing curtailment.

CORD FABRICS

Combed Sakellarides		Nominal	
Combed Peeler	lb.	Nominal	
Carded Peeler		.50 @	.53
Combed Egyptian uppers	lb.	.67 @	.72
Carded Egyptian uppers	lb.	.61 @	.65

SQUARE WOVEN

17¼-ounce Egyptian uppers, combed	lb.	Nominal	
17¼-ounce Egyptian uppers, carded	lb.	.60 @	.63
17¼-ounce Sakellarides, combed	lb.	Nominal	
17½-ounce Peeler, carded	lb.	.48 @	.50

Ducks—Activity in the cotton duck market during the past two weeks has been largely confined to small filling-in sales. Second hands continued to offer part of their holdings at slight concessions under first hand prices. Business was done for the most part, however, at prices which only partially reflected the easier cotton situation.

Burlaps—On the Government jute report published in Calcutta the mills here were free sellers. Receipts of jute were shown to be over 10 per cent more than last year. Stocks in bazaar were reported two-thirds more than last year. Purchases by mills, however, are 20 per cent less than a year ago. Exports are nearly 50 per cent more. Mills are selling goods and not purchasing jute.

SHEETINGS

40-inch	2.50-yard	yd.	.14¼	@	—
40-inch	2.85-yard	yd.	.12½	@	—
40-inch	3.15-yard	yd.	.14¼	@	.14½
40-inch	3.60-yard	yd.	.11¾	@	.12
40-inch	3.75-yard	yd.	.10¾	@	—
40-inch	4.25-yard	yd.	.09	@	—

DUCKS

Belting	lb.	.41	@	.44
Hose	lb.	.41	@	.44
Enameling	lb.	.42	@	.46
Shoe Ducks	lb.	.42	@	.46
Single filling	lb.	.18½	@	.20½
Double filling	lb.	.21½	@	.22½

BURLAPS
(Carload Lots)

7½-ounce 40-inch	9.40	@	—	
8 -ounce 40-inch	9.90	@	—	
10 -ounce 40-inch	12.40	@	—	
10½-ounce 40-inch	12.75	@	—	

J. H. LANE & CO.

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FABRICS—Tire fabrics—coarse builders, chafers, breakers in all grades.
New England Southern Mills
LAWRENCE & CO.
24 Thomas St. New York
Boston, Philadelphia, Chicago, St. Louis, San Francisco

HEEL BURRS—with central holes; flat and cupped.
J. H. Sessions & Son
279 Riverside Ave. Bristol, Conn.

RECLAIMED RUBBER—for all purposes.
Rubber Regenerating Co.
Naugatuck, Conn.

THE MARKET PLACE Section Continued on Second Page Following.

Reclaimed Rubber

NEW YORK, Nov. 4, 1925

The continued high demand for all grades of reclaimed is keeping the plants of reclaimers operating at maximum capacity. Prices however are easier, showing the tendency of reclaimers to keep quotations at fair levels based on prices of crude. Increasing manufacturing facilities will ease the present delivery situation but no material effect is expected in this direction for some months. Prices follow:

Friction (Uncured)				
No. 1	lb.	.65	@	.68
No. 2	lb.	.50	@	.55
High Tensile Black				
Super-Reclaim No. 1	lb.	.30	@	.31
" " No. 2	lb.	.16½	@	.17½
Shoe				
Unwashed	lb.	.10¼	@	.10¾
Washed	lb.	.13¼	@	.13¾
Tube				
No. 1 (Floating)	lb.	.26½	@	.27½
No. 2 (Compounded)	lb.	.18½	@	.19
Tires				
Black unwashed	lb.	.10½	@	.11
Black, washed	**lb.**	**.12**	**@**	**.13**
Black, selected tires	lb.	.12½	@	.13
Dark Gray	lb.	.14½	@	.15
Light Gray	**lb.**	**.15½**	**@**	**.16**
White	lb.	.18½	@	.19
Truck, Heavy Gravity	lb.	.10½	@	.11
" Light Gravity	lb.	.11½	@	.12
Miscellaneous				
Mechanical Blends	lb.	.08	@	.09
Red, High Grade	lb.	.17½	@	.18

Scrap Rubber

NEW YORK, Nov. 2, 1925

Reclaimers have been buying here and there but no great volume has been involved. Deliveries are largely confined to existing contracts. Prices have been influenced by the crude rubber market, and both reclaimers and scrap dealers are watching it closely. Dealers have been inclined to hold quotations firm, although bids when they are made are controlled by inside figures. However, reclaimers are refusing to pay higher prices.

Auto tire peelings		.02	@	—
Standard White auto	ton	45.00	@	50.00
Mixed auto	ton	26.00	@	28.00
Bicycle tires	ton	16.00	@	18.00
Clean solid truck tires	ton	45.00	@	50.00
Boots and shoes		.02¾	@	.03
Arctics, untrimmed		.01½	@	.01¾
Arctics, trimmed		.02	@	.02¼
Inner tubes, No. 1		.10	@	.11
Inner tubes, compounded		.08	@	.09
Inner tubes, red		.06½	@	.07½
Air Brake Hose	ton	18.00	@	20.00
Rubber hose	ton	15.00	@	17.00

Crude Rubber

NEW YORK, Nov. 2, 1925.

News of the loss of a considerable cargo of rubber drove spot and nearby prices sharply forward on the 20th, although bidding was not very active and few parcels were turned over. Prices were well maintained for the next four days. The market is not expected to weaken to any extent during the next few months, judging by the price of distant positions. Sales over the whole of 1926 have been made at levels which do not indicate any probable weakening during that period.

On the 26th a favorable stock report from London and bearish advices from the Far East drove buyers back and caused local weakness. But the market was steady and firm the following day. There were buyers in the nearby positions throughout the day but there were too few real sellers in the market to make for any great activity. Quotations have been unfirm and when bids were brought forward the quotations were usually withdrawn or advanced rather sharply; most of the local interests seemed bullish on the immediate future of the market.

The majority of manufacturers were awaiting the announcement due Nov. 2 regarding the release under the restriction plan. It was not expected that this would be more than 10 per cent than for the last quarter. Arrivals on the 30th were rather heavy and brought the total to date to practically 31,000. Estimates for consumption for the month were placed at from 28,000 to 31,000 tons. With the *S.S. American Trader* and the *Celtic Prince* practically assured of arriving, the month's arrivals were expected to total 35,000 tons.

No easing of the forward position with the turn of the month was looked for. There is still need of spot rubber, although not as acute as that of a month or two ago. There has been good consumer buying in the forward positions and they have been quite firm. All factors seem to indicate no immediate weakness or not even an easier position of the market during the next few months.

It was officially announced in London that the percentage of the standard production of rubber that may be exported at minimum duty from Ceylon, the Straits Settlements and the Malay States for the quarter beginning Nov. 1 has been fixed at 85, in accordance with the provisions of the Stevenson Plan. This is 10 per cent more than for the preceding quarter.

NEW YORK MARKET

Plantations—			
Ribbed Smoked Sheets			
Spot	.99	@	1.01
November	.96	@	.98
Nov./Dec.	.96	@	.97
December	.95	@	.96½
Jan./March	.88½	@	.90
April/June	.82	@	.83
First Latex, crepe spot	1.00	@	1.02
Amber Crepe, No. 2, spot	.90	@	.91
" " No. 3,	.89	@	.90
" " No. 4,	.87	@	.88
Brown Crepe, Rolled	.77	@	.79
" " Clean, thin	.90	@	.91
" " Specky	.88½	@	.89½
Pontianac—			
Bangermassin	Nominal		
Palembang	Nominal		
Prime Pressed	Nominal		
Sarawak	Nominal		
Paras—			
Up-river Fine	.95	@	.96
" Medium	.82	@	.84
" Coarse	.56	@	.58
Islands, Fine	.74	@	.77
Acre Bolivian, fine	.94	@	.96
Tapajos, fine	.80	@	.82
Cut Beni Bolivian, fine	.79	@	.80
Caucho Ball—			
Upper, shipment	.62	@	.64
Centrals—			
Corinto, scrap	.56	@	.57
Esmeraldo, sausage	.57	@	.58
Guayule, w and d	.52	@	—
Africans—			
Benguela, No. 2	Nominal		
Congo, upper, black	Nominal		
" " red	Nominal		
Kassai, Prime Red	Nominal		
Balata—			
Block, Columbia	.48	@	.50
" Cuidad	.58	@	.59
Surinam ,sheet	.71	@	.73
Gutta Percha—			
Siak	.20	@	.22
Red Macassar	3.50	@	—
Chicle—			
Mexican, Yucatan	.58	@	.68

LONDON MARKET

Standard Ribbed Smoked Sheets—	
Spot	48 d
November	47½
December	46½
Jan./March	42½
April/June	39¾

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—	
Spot	45⅝d
Nov./Dec.	45⅛
Jan./March	40⅝
April/June	37½

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OF EVERY DESCRIPTION

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Equitable Building, 120 Broadway, New York

SEA ISLANDS EGYPTIANS PEELERS

FABRICS TO SPECIFICATION

AMERICAN COTTON FABRIC CORPORATION

The Market Place

RECLAIMED RUBBER
A standardized grade for every requirement.
U. S. Rubber Reclaiming Co., Inc.
100 E. 42nd St., New York, N. Y.
"42 Years Serving the Industry Solely as Reclaimers"

RED OXIDE—A special grinding, guaranteed uniform in color and quality.
Joseph A. McNulty
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Places your products among the leaders in the field!

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THERMOMETERS—Recording, controlling temperature and pressure controllers.
American Schaeffer & Budenberg Corp.
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The Akron Rubber Mold & Machine Co.
Akron, Ohio

RUBBER—Crude and scrap, all grades.
H. Muehlstein & Co.
Liggett Bldg. New York
Akron, Chicago, Boston, Hoboken

SOLVENT RECOVERY EQUIPMENT
50 to 90 Per Cent Recovery
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For Heels, Soles and Mechanical Rubber Goods.
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Always Buying and Selling
Rubber Waste, Cured and Uncured, Hard Rubber, Balata, Gutta Percha.
HERMAN WEBER
Newark & Jackson Sts., Hoboken, N. J.

SPEED REDUCERS
IXL Speed Reducers, Cut Gears, Micarta Pinions and Timing Gears, Flexible Couplings, Gear Racks, etc.
Foote Bros. Gear & Mach. Co.
238-248 N. Curtis St., Chicago, Ill.

USED MACHINERY
Mills, Calenders, Grinders, Washers
New and Old Rubber Scrap
Rubber Cloth Remnants
M. Norton & Co.
Locust St. Medford, Mass.

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White, brown and black.
Carter Bell Mfg. Co.
150 Nassau St. New York

STRIP CUTTING MACHINES
For cutting all rubber, composition and plain or impregnated fabrics.
Cameron Machine Co.
61 Poplar St., Brooklyn, N. Y.

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manufactured from *Genuine English Chalk* and *Cliffstone*—no adulterations.
Southwark Mfg. Co.
Camden New Jersey

RUBBER SUBSTITUTES
All grades — Samples furnished.
Manufactured by
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531 South Peoria St. Chicago

SULPHUR—*"Tire"* Brand Superfine; *"Tube"* Brand Velvet; quality Sulphur for the rubber trade.
Stauffer Chemical Co.,
of Texas.
Scanlon Bldg. Houston, Texas
San Francisco, Cal. Chauncey, N. Y.

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American Zinc Sales Co.
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485 Fifth Ave., N. Y. City

TAR—PINE, RETORT, KILN
All grades for the rubber manufacturer.
Pensacola Tar and Turpentine Co.
Gull Point, Florida

ZINC OXIDES — Including KADOX and "Albalith."
The New Jersey Zinc Sales Company
New York Pittsburgh Chicago
Cleveland San Francisco

CHEMICALS & COMPOUNDING INGREDIENTS

Accelerators — Colors — M.R. — Compounding Ingredients
Softeners — Vulcanizing Ingredients — Rubber Substitutes

NEW YORK, November 4, 1925—A slight stiffening of prices is evident in the compounding ingredients market in certain lines but it is considered negligible. Carbon black is firm with demand in good force. Accelerators are more than holding their own and a few new ones are being added to the list almost every month. One manufacturer of accelerators, softeners and pigments reports a 50% increase in tonnage turnover this year over 1924. Demand continues in good force and the slight let-down in production is hardly felt. That 1926 is expected to be another banner rubber year is seen from the bids for 1926 contracts sent out by one of the largest rubber manufacturers one month in advance of previous years. Quotations follow:

ACCELERATORS

Organic			
Aldehyde ammonia, crystals	lb.	$ .90	@ .93
Aniline oil, drums	lb.	.17	@ .17½
Di-Ortho-Tolylguanidine	lb.	1.10	@ 1.13
Diphenylguanidine	lb.	.95	@ .98
Ethylidene aniline	lb.	.60	@ .65
Excellerex	lb.	.28	@ .34
Formaldehyde-Aniline	lb.	.40	@ .42½
Grasselerator 102	lb.	.80	@ .82
Grasselerator 552	lb.	4.80	@ 5.00
Hexamethylene-tetramine	lb.	.80	@ .82½
Paraphenylenediamine	lb.	1.25	@ 1.30
Piperidine-Piperidyldithio-Carbamate	lb.	4.80	@ 5.00
Super-Sulphur No. 1	lb.	.50	@ .55
Super-Sulphur No. 2	lb.	.18	@ .30
Tensilac, No. 41	lb.	.65	@ —
Tuads	lb.	4.50	@ 5.00
Thiocarbanilide, kegs	lb.	.25	@ .32
Triphenylguanidine	lb.	.70	@ .75
Vulcone	lb.	.75	@ .79
Zimate	lb.	5.00	@ —
Inorganic			
Lead, sublimed blue	lb.	.10	@ —
Lead, white	lb.	.10¾	@ —
Litharge, domestic	lb.	.11¾	@ —
Lime, superfine	lb.	.01½	@ .02
Magnesia, calcined, light	lb.	.24	@ .25
extra light	lb.	.40	@ .45
heavy	lb.	.04	@ .06½

COLORS

Blacks			
Arrow "Aerfloted"	lb.	.08½	@ .12½
Bone Black	lb.	.05½	@ .11
Carbon "	lb.	.08	@ .12
Drop "	lb.	.07½	@ .14
Ivory "	lb.	.12	@ .45
Lamp "	lb.	.12	@ .40
Micronex	lb.	.09	@ .13
Thermatomic carbon	lb.	.04	@ .08
Blues			
Cobalt	lb.	.21	@ .26
Prussian	lb.	.34	@ .35
Ultramarine	lb.	.08	@ .35
Browns			
Iron oxide	lb.	.02¼	@ .06¼
Sienna, Italian	lb.	.04	@ .14
Umber, Turkey	lb.	.04	@ .06
Vandyke, domestic	lb.	.03	@ .03½
Greens			
Chrome, light	lb.	.28	@ .30
medium	lb.	.30	@ .32
dark	lb.	.31	@ .34
commercial	lb.	.09	@ .10
Chromium Oxide, bbl.	lb.	.37	@ .38
Reds			
Antimony crimson, 15/17 F.S.	lb.	.43	@ .45
sulphur free	lb.	.46	@ .49
golden, 15/17 F.S.	lb.	.17	@ —
pentasulphide, pure	lb.	.35	@ .38
15/17 F.S.	lb.	.33	@ .36
red sulph. 15-17F.S.	lb.	.16	@ .20
Indian English	lb.	.11	@ .15
Oximony	lb.	.13½	@ —
Para toner	lb.	.90	@ 1.00
commercial	lb.	.13½	@ .14½
Red oxide, reduced	lb.	.04	@ .12
pure	lb.	.11	@ .15
Toluidine toner	lb.	1.85	@ 2.10
Venetian red	lb.	.01½	@ .05
Vermillion, quicksilver, English	lb.	1.40	@ 1.50
domestic	lb.	.15	@ .25
Whites			
Albalith	lb.	.05⅞	@ .06⅛
Aluminum bronze		.55	@ 1.20
Lithopone, Akcolith	lb.	.06	@ .06½
Lithopone, Azolith	lb.	.05⅝	@ .06⅛
Zinc Oxide—American Process XX red	lb.	.07½	@ .07¾
Kadox, black label, kegs	lb.	.10⅝	@ .11¼
blue " " "		.09⅝	@ .10⅛
red " " "		.08⅝	@ .09⅛
American Azo: ZZZ (lead free)	lb.	.07¼	@ .07¾
ZZ (under 5% leaded)	lb.	.07	@ .07½
Zinc Oxide—French Process White seal	lb.	.12⅜	@ —
Green seal	lb.	.11⅛	@ —
Red seal	lb.	.10⅛	@ —
Yellows			
Chrome, light		.17½	@ .18½
dark and medium	lb.	.17½	@ .18½
Cadmium Sulphide	lb.	1.20	@ 1.50
Ocher, French medium	lb.	.03¼	@ —
domestic	lb.	.00½	@ .02

COMPOUNDING INGREDIENTS

Aluminum Flake (f.o.b. plant)	ton	21.85	@24.50
hydrate light	lb.	.16½	@ .17
Ammonia carbonate	lb.	.17½	@ .19
Asbestine	ton	14.50	@18.50
Barium carbonate	ton	54.00	@56.00
Barium Dust	lb.	.05	@ .06
Barytes southern off-color, ton		12.00	@18.00
Western prime white ton		22.00	@23.00
imported	ton	27.00	@34.00
Basofor	lb.	.04¼	@ —
Blanc fixe dry f.o.b. works	lb.	.03¾	@ .04
Carrara filler	lb.	.01¾	@ .02
Chalk, precip., extra light	lb.	.04½	@ .05
heavy	lb.	.03¼	@ .04
Clay, China, domestic	ton	15.00	@25.00
Catalpo (fact.)	ton	35.00	@38.00
Dixie	ton	20.00	@35.00
Blue Ridge, Dark	ton	9.00	@ —
" " Light	ton	12.00	@ —
Langford	ton	12.00	@22.00
Glues, extra white	lb.	.20	@ .29
medium white	lb.	.18	@ .24
common bone	lb.	.11	@ .14
Graphite flake, bbls.	lb.	.06½	@ .12
Infusorial earth, powdered	ton	23.00	@25.00
bolted	ton	15.00	@20.00
Liquid latex	gal.	3.00	@ —
Magnesia, carbonate	lb.	.08¼	@ .09
Mica, powdered	ton	65.00	@80.00
Rotten Stone (powdered)	lb.	.05	@ .07
Soapstone, powdered	ton	15.00	@22.00
Starch, powdered	cwt.	3.81	@ —
Talc, domestic	ton	16.00	@18.00
Terra Alba	cwt.	1.25	@ 2.00
Tripoli, white	lb.	.02	@ .02¼
Whiting, commercial	cwt.	1.00	@ 1.15
gilder's bolted	cwt.	1.25	@ 1.35
English cliffstone	cwt.	1.50	@ —
Paris whiteAmerican	cwt.	1.25	@ 1.50
Quaker	ton	13.00	@15.00
Sussex	ton	8.00	@10.00
Wood pulp XXX	ton	35.00	@ —
" " X	ton	25.00	@ —

MINERAL RUBBER

Genasco (factory)	ton	50.00	@52.00
Granulated M.R.	ton	36.00	@45.00
Hydrocarbon, Hard	ton	29.00	@35.00
Hydrocarbon, Soft	ton	29.00	@35.00
320/340 M.P. hydrocarbon (c. l. factory)	ton	47.00	@52.00
300/310 M.P. hydrocarbon (c. l. factory)	ton	42.00	@47.00
Paradura	ton	70.00	@75.00
Robertson, MR, solid	ton	25.00	@60.00
M.R. (gran)	ton	42.00	@80.00

SOFTENERS

Acids			
Acetic, 28%	cwt.	3.13	@ 3.48
Cresylic, 97%	gal.	.54	@ .60
95%		.53	@ .58
Muriatic, 20%	cwt.	.90	@ 1.00
Nitric, 36 degrees	cwt.	4.50	@ 4.75
Sulphuric, 60 degrees	ton	10.00	@11.00
66 degrees	ton	14.00	@15.00
Tartaric, crystals	lb.	.29	@ —
Alkalies			
Caustic soda, 76%	cwt.	3.20	@ —
Soda ash, 58% C.L.	cwt.	1.43	@ 1.45½
Oils			
Castor, No. 3 bbls.	lb.	.15¼	@ —
Corn, crude, bbls.	lb.	.12	@ —
refined	lb.	.13	@ —
Cottonseed, crude		.08¼	@ —
Glycerine, C.P. drums	lb.	.20	@ .20½
Linseed, Raw C.L. bbl.	gal.	1.00	@ —
Palm, Lagos	lb.	.09	@ —
Niger	lb.	.08⅝	@ .08¾
Peanut, domestic crude	lb.	.12	@ —
Petrolatum, white		.10½	@ .10¾
amber		.03½	@ .03¾
dark amber	lb.	.03¼	@ .03⅜
Pine, steam distilled	lb.	.63	@ .65
Rapeseed, refined	gal.	.97	@ 1.00
blown	gal.	1.15	@ —
Rosin, first rectified	gal.	.82	@ .83
second rectified	gal.	.86	@ .87
Soya Bean, crude		.13¼	@ .13½
Tar, commercial	gal.	.30	@ .32
Resins and Pitches			
Parra M.R.	lb.	.06	@ .07
Tar Retort	bbl.	15.00	@15.50
kiln burned	bbl.	15.00	@15.50
Pitch, Burgundy	lb.	.06	@ .06½
coal tar	gal.	.05½	@ .06
pine	bbl.	6.50	@ 7.00
Rosin, grade K	bbl.	15.55	@ —
Solvents			
Alcohol denatured, No. 1 bbls.	gal.	.60½	@ .64½
Benzol, 90%	gal.	.28	@ .30
pure		.32	@ —
Carbon bisulphide	lb.	.06	@ .07
tetrachloride	lb.	.06¾	@ .07
Dimethylaniline	lb.	.32	@ .34
Motor gasoline, steel bbls.	gal.	.17	@ —
Naptha, V. M. & P.	gal.	.16¾	@ —
Toulene	gal.	.31	@ —
Turpentine, spirits	gal.	1.11	@ 1.12
wood	gal.	.95	@ .96
Waxes			
Beeswax	lb.	.55	@ .65
Carnauba, No. 1	lb.	.44	@ .45
Ceresin, white	lb.	.10	@ .11
Montan, crude	lb.	.06	@ .06½
Ozokerite, black	lb.	.24	@ .25
green	lb.	.26	@ .30
Paraffine White, A.M.P.	lb.	.05½	@ .05¾
Yellow A.M.P.	lb.	.05¾	@ .05⅞
Sweet wax	lb.	.12	@ —

SUBSTITUTES

Black	lb.	.08½	@ .15
White	lb.	.10½	@ .17½
Brown	lb.	.09	@ .18
Brown factice	lb.	.10	@ .16
White factice	lb.	.10½	@ .17½

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.18	@ .20
Ethyl Chloride, Cyl.	lb.	.55	@ —
" " Drums	lb.	.45	@ —
Sulphur Chloride (drums)	lb.	.07	@ —
Sulphur flour Commercial bags	cwt.	1.35	@ 1.70
" bbls.	cwt.	1.70	@ —
Superfine, bags	cwt.	2.00	@ 2.40
" bbls.	cwt.	2.40	@ 2.70
100% pure, refined, bags	cwt.	2.30	@ 3.00
bbls.	cwt.	2.50	@ 3.40

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Is the Use of Oils and Pitches Desirable in High Grade Rubber Compounds?

ALMOST all rubber chemists agree that small quantities of carefully chosen mineral and vegetable softeners can be safely used, but present day production standards call for larger mill batches, shorter periods for breaking down the rubber, higher calender speeds and faster tubing than formerly. Small percentages of a softener are not enough. What then?

DU PONT METHYLENEDIANILIDE

solves the problem. When used in small amounts it inhibits scorching far out of proportion to its mechanical softening effect. At vulcanizing temperatures it acts as a mild auxiliary accelerator; and it does not weaken or soften the vulcanized rubber, nor decrease its resiliency.

Let *Methylenedianilide* increase your mill room and calender room capacity!

E. I. du Pont de Nemours & Co., Inc.,
Dyestuffs Department, Sales Division,
WILMINGTON, DELAWARE
8 Thomas St., New York, N. Y.

Vulcanization DU PONT *Accelerators*

Carbon Tetrachloride vs. Carbon Bisulphide

(*Concluded from Page* 91)

recommendations are to be found in the Proceedings of the 12th Safety Congress on pp. 212-213 and are re-emphasized in the Committee's Second Progress Report (see Proceedings of the 13th Safety Congress) on p. 277. I am also thoroughly in sympathy with the idea expressed at your last meeting that Benzol Committee broadens its activities to take into consideration other toxic solvents.

This paper could not have been prepared without the able assistance of Chas. F. Horan and of the Library and Information Bureau of the N.S.C.; of certain Ohio public officials, namely Russell D. Scott, Chief Chemist, Fred Berry, Chief of Laboratories, and Dr. D. J. Kindel, Chief of the Division of Industrial Hygiene, of the State Dept. of Health; H. L. Rebrassier, Chief of the Claims Division of the Dept. of Industrial Relations; certain local health officials and especially the physicians in the State of Ohio who have faithfully reported occupational diseases for the past 12 years and made available the findings on over 5,000 cases.

Summary and Conclusions

1. Immunity, habituation, and toleration to the types of poisons customarily used in industry are not included in our philosophy for the safe handling of them.

2. Industrial poisons emphasize their actions differently, some at the portal of entry, some within the body, some at the points of elimination and some at two or more of these places,—hence we have for each a *locis minoris* for their supervision.

3. The "threshold," or maximum amount for physiological negotiation each day, has been fairly well established by biochemists and pharmacologists for each of the poisons used in industry,—again enabling the chemist and engineer to perfect control.

4. Certain solvents like carbon-bisulphide, carbon-tetrachloride, benzol and others must be used if industry is to exist and progress, and, where interchangeable, it is desirable to know which are the least dangerous.

5. The use of carbon-bisulphide is resulting in much less frequent reports of cases of poisoning, probably because of its decreasing use in the former processes in which it was much used and the greater care observed, especially in the newer operations. There is no evidence that this substance is formed by combining two of the common substitutes, viz., carbon-tetrachloride and sulphur monochloride, but impurities must be watched for.

6. Recent textbooks on industrial hygiene discuss the disabilities due to these poisons and sum up the literature very fully. Dr. Richard L. Cameron of Buffalo, describes the most recent cases of carbon-bisulphide poisoning, while Dr. E. B. Starr and Dr. Alice Hamilton give the most recent descriptions of industrial carbon-tetrachloride poisoning.

7. We fear that the Tentative Report of the Industrial Poisons Committee which places the allowable limit of one part of carbon-bisulphide to 1,000 of air is much too high, as other investigators have placed it as low as one part in a million.

8. Carbon-tetrachloride has had rather wide use in medicine and is recognized as a toxic substance similar to chloroform, but inferences adaptable to industry would appear to show that it is much the safer of the solvents discussed. The tentative recommendations suggested by the Benzol Committee for handling benzol would appear easily capable of preventing poisoning by carbon-tetrachloride.

9. Symptoms of chronic poisoning by carbon-tetrachloride in industry have been reported, and point to the fact that ventilation must be given full attention where it is used. Since it is a lipoid solvent it should also be kept from wetting the hands or skin.

10. We have to thank numerous persons connected with industrial establishments and public offices for the opportunity of presenting apparently worth-while statistics today and, most of all perhaps, the practicing physicians who are faithfully reporting as well as publishing case reports of occupational diseases.

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